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METEOROLOGICAL ABSTRACTS AND BIBLIOGRAPHY

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C. Cumulative, annotated bibliographies on subjects of immediate and special interest to meteorologists.

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METEOROLOGICAL ABSTRACTS AND BIBLIOGRAPHY

MALCOLM RIGBY, Editor

Vol. 1 JULY 1950 No. 7

SPECIAL FEATURE IN THIS ISSUE

A Selective Annotated Bibliography on Climatic Changes

(*For complete table of contents see back cover*)

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FOREWORD

Each issue of Meteorological Abstracts and Bibliography consists of four parts, as can be seen in the table of contents on the back cover.

Part I comprises 100 to 200 classified and annotated references to current material in the field of *Meteorology* and other fields immediately applicable to *Meteorology*.

In addition, the first issue (Vol. 1, No. 1) contained a **Review of 30 Current Meteorological Periodicals,** and the second issue a **Review of 15 Meteorological Periodicals which have lapsed.**

Part II of each issue provides a means of accumulating the important references on given subjects without respect to recency. It is impossible to make these bibliographies exhaustive under present personnel, time and printing limitations; but every attempt is made to include a representative cross section of the various aspects of each subject, some preference being given to recent material, comprehensive works, those from obscure sources and those with good bibliographies.

Selective, annotated bibliographies consisting of from 50 to 300 items each, have been printed in the issues of Meteorological Abstracts and Bibliography, as follows:

(1) **Atmospheric Pollution,** Vol. 1, No. 1, Jan. 1950
(2) **Aerobiology,** Vol. 1, No. 2, Feb. 1950
(3) **Cloud Physics and "Rain Making,"** Vol. 1, No. 3, March 1950
(4) **Hail,** Vol. 1, No. 4, April 1950
(5) **Tornadoes,** Vol. 1, No. 5, May 1950
(6) **Volcanic Dust,** Vol. 1, No. 6, June 1950
(7) **Climatic Changes,** Vol. 1, No. 7, July 1950

Future issues will contain:

(8) **Thunderstorms,** Vol. 1, No. 8, August 1950
(9) **Icing,** Vol. 1, No. 9, September 1950
(10) **Acoustical Sounding of the Stratosphere,** Vol. 1, No. 10, October 1950

In Part III the contents of those journals which are primarily meteorological are listed and published in the earliest issue where space permits. These entries are not classified or indexed.

Part IV consists of author, subject and geographical indexes. The subject and geographical indexes are made up, as a rule, from the subject headings which follow each entry.

In the June and December issues *cumulative* author and subject indexes will be published.

LIST OF PERIODICALS

Note: In this list the preferred form of title for entry is given in bold face type. If the title is distinctive, the name and headquarters of the issuing society or organization follows the title. If the title is not distinctive the issuing organization precedes and is part of the title.

PERIODICALS IN WHICH METEOROLOGICAL ARTICLES REGULARLY APPEAR

Akademiia Nauk, SSSR, Izvestiia, Ser. Geogr. i Geofiz., [Moscow].
American Geophysical Union, Transactions, National Research Council, Washington.
★**American Meteorological Society, Bulletin,** [Boston].
★**Annalen der Meteorologie,** Meteorologisches Amt für Nordwestdeutschland, Hamburg.
Annali di Geofisica, Istituto Nazionale di Geofisica, [Rome].
Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A and Ser. B, [Vienna].
Ciel et Terre, Société Belge d'Astronomie, de Météorologie et de Physique du Globe. Uccle-Bruxelles.
Geofisica Pura e Applicata, Istituto Geofisica Italiano, [Milan].
Geophysical Magazine, [Central Meteorological Observatory, Toyko].
Hemel en Dampkring, Nederlandse Vereniging voor Weer- en Sterrenkunde, [The Hague].
★**Időjárás,** Az Országos Meteorológiai és Földmágnességi Intézet, [Budapest].
★**Indian Journal of Meteorology and Geophysics,** [Delhi].
Journal of Geophysical Research (formerly Terrestrial Magnetism and Atmospheric Electricity), [Washington].
★**Journal of Meteorology,** American Meteorological Society, [Boston].
★**Journal Scientifique de la Météorologie,** Société Météorologique de France, [Paris].
★**The Marine Observer,** Air Ministry, Meteorological Office, London.
★**The Meteorological Magazine,** Air Ministry, Meteorological Office, London.
★**Meteorological Society of Japan, Journal,** Second Series, Kisho Shushi, [Tokyo].
★**Meteorologické Zprávy,** Státní Meteorologický ústav v Praze, [Prague].
★**La Météorologie,** Société Météorologique de France, [Paris].
★**Meteorologische Rundschau,** Bad-Kissingen, [U. S. Zone, Germany].
★**Monthly Weather Review,** U. S. Weather Bureau, Washington, D. C.
★**Nimbus,** Sociedad Meteorológica de Bolivia, [La Paz].
Polarforschung, Archiv für Polarforschung in Kiel, [Kiel, British Zone, Germany].
★**Revista Meteorológica,** Junta Nacional de Meteorología, Montevideo.
★**Rivista di Meteorologia Aeronautica,** Associazione Culturale Aeronautica, [Rome].
★**Royal Meteorological Society, Quarterly Journal,** [London].
★**Tellus,** Svenska Geofysiska Föreningen, Stockholm.
Vsesoiuznoe Geograficheskoe Obshchestvo, SSSR, Izvestiia, [Moscow-Leningrad].
★**Weather,** Royal Meteorological Society, [London].
★**Weatherwise,** Amateur Weathermen of America, Philadelphia.
★**Wetter und Klima,** Deutscher Meteorologischer Dienst im Französischen Besatzungsgebiet, Seelbach b. Lahr/Baden, [French Zone, Germany].
★**Wetter und Leben,** Österreichische Gesellschaft für Meteorologie, [Vienna].
★**Zeitschrift für Meteorologie,** Meteorologisches Observatorium, Potsdam, [U. S. S. R. Zone, Germany].

★ Indicates those periodicals which are primarily meteorological.

EXPLANATIONS

Location of material: While it is physically impossible to give for each entry the name of every library where that item might be obtained, it is possible, by using standard library symbols, to give the reader some idea of where he might obtain such material. So in most instances a symbol taken from the Union List of Serials (Gregory), or the Union Catalogue of the Library of Congress will be given just before the text of each abstract. In some cases where no symbol has been assigned to a library, one will be invented by using the general principle of the Union Catalogue list. As a rule the library indicated will be in the District of Columbia, with an occasional reference to one in New York or Boston. It will be noted that D stands for District of Columbia, M for Massachusetts and N for New York. Thus **DWB** stands for the U. S. Weather Bureau Library in Washington, D. C., and **MH–BH** for the Blue Hill branch of the Harvard Library in Boston, Mass. In the latter case, since the Blue Hill Observatory contains not only the Harvard Observatory Library but that of the American Meteorological Society, the same symbol (**MH–BH**) will stand for either or both libraries.

Library symbols: The following abbreviations have been used for Libraries in which the specific material thus indicated in this issue is located:

DA:	U. S. Department of Agriculture Library, Washington, D. C.
DAMS:	Material in hands of American Meteorological Society Abstracts, P.O. Box 1736, Washington 13, D. C.
DBS:	U. S. Bureau of Standards Library, Washington, D. C.
DLC:	Library of Congress, Washington, D. C.
DWB:	U. S. Weather Bureau Library, Washington, D. C.
MH:	Harvard University Library, Cambribge, Mass.
MH–BH:	Harvard University, Blue Hill Observatory (and American Meteorological Society) Library, Milton, Mass.

Geographical (place) names are in the form generally used internationally, rather than in the form used locally. For instance Vienna is used instead of Wien, Florence for Firenza, Moscow for Moskva and Germany for Deutschland, etc.

Titles of articles or monographs are in the language of the original article unless otherwise stated. Slavic (Cyrillic) titles are transliterated according to the Library of Congress transliteration scheme into the Roman Alphabet.

Entries for **titles of periodicals** are given in the form used on the title page of the periodical providing the title is distinctive (Monthly Weather Review, Meteorologiské Zprávy, and Revista Meteorológica). If the journal is the official organ of a society or institution and the title is not distinctive, as is the case with Transactions, Bulletins, Proceedings, Comptes Rendus, Trudy, Izvestiia, Sitzungsberichte, Verhandelingen, Miscellanées, etc., the preferred name of the organization is given first, as part of the title (American Geophysical Union, Transactions; Royal Society of London, Proceedings).

Abbreviations and other symbols:

Titles of periodicals are not abbreviated as a rule. Other abbreviations will be used sparingly and only when the abbreviation is obvious.

The months of the year from March through July are not abbreviated. Other months are abbreviated as Jan., Feb., Aug., Sept., Oct., Nov., and Dec., respectively.

The word or abbreviation for Volume, (Tom, Band, Jahrgang, Año, etc.) and for Number (Heft, Fascicule, Vypusk) and page or pages is omitted from most entries. Thus an entry will read as follows:

Meteorologische Rundschau 2(5/6):146–151, May/June 1949.

This indicates that the article was in the Meteorologische Rundschau, Jahrgang 2 (Vol. 2), Heft 5/6 (No. 5 and 6), pages 146–151, Mai/Juni 1949.

The symbol * before an entry indicates a good data source.

The symbol † before an entry indicates a good bibliography source.

The symbol § indicates a synoptic case history study accompanied by charts.

PART I. ABSTRACTS OF CURRENT METEOROLOGICAL MATERIAL

GENERAL METEOROLOGY

7–1 551.5(02) 551.58(489)

*§Lysgaard, Leo, **Lufthav, Vejr og Klima; populaer Meteorologi.** [Atmosphere, weather and climate; popular meteorology.] Copenhagen, Gyldendel, **1943.** 232 p. 94 figs., 3 tables. **DLC**—A well illustrated, popular textbook on weather and climate, written in Danish by the Chief of the Meteorological Service of Denmark. Besides the usual discussion of the composition of the atmosphere, air masses and fronts, temperature, rainfall, snow, clouds, etc., this book contains a number of interesting chapters on such subjects as condensation and sublimation nuclei, ozone, actinometry, radiosondes, thunderstorm electricity, the aurora, etc. In the section on climate, the author discusses and illustrates the subject from the point of view of the principle synoptic weather types that determine the climate of western Europe. A chapter on the climate of Denmark gives mean monthly data for a number of stations in that country; a chapter on "World Climate" does the same for each continent and lastly, there is a discussion of artificial climates or bioclimatology. *Subject Headings:* **General Meteorology, Climatology, Textbooks, Denmark.**—*M.R.*

7–2 551.5:06(04)

Meetham, A. R., **Sir Robert Watson-Watt discusses meteorology.** *Weather*, 5(4):142–143, **April 1950. MH-BH**—*Subject Headings:* **Royal Meteorological Society, Addresses, History, Great Britain.**

7–3 551.5:92

Menzl, Oswald, **Nachruf auf Professor Dr. Rudolf Spitaler und Dr. Josef Mrazek.** [Obituary of Professor Dr. Rudolf Spitaler (b. Jan. 7, 1859–d. Oct. 1946) and Dr. Josef Mzarek (b. April 11, 1891–d. March 26, 1946).] *Meteorologische Rundschau*, 3(1–2):36–37, Jan.–Feb. **1950. DWB**—*Subject Headings:* **Meteorology, Biographies.**

7–4 551.5:06

The centenary. *Weather*, 5(5):189–193, May **1950.** 4 photos. **DWB**—Brief reports of symposia at Oxford, visit to Imperial College, Centenary meeting (address by Sir Robert Watson-Watt) and Centenary dinner. *Subject Headings:* **Conventions, Royal Meteorological Society.**

7–5 551.5:016(09)

†Seilkopf, Heinrich, **Zur Geschichte der meteorologischen Arbeit an der Deutschen Seewarte, Hamburg.** [On the history of meteorological work at the German Naval Observatory Hamburg.] *Annalen der Meteorologie*, 3(1–2):53–56, [Jan.–Feb.] **1950. DWB**—Norddeutsche Seewarte founded 1867, became State Institute 1 Feb., 1875. Principal investigations mentioned and a bibliography of 73 special publications given. *Subject Headings:* **Marine meteorology, Bibliographies, History, Germany.**—*C.E.P.B.*

7–6 551.5:06(09)

Watson-Watt, Robert, **The evolution of meteorological institutions in the United Kingdom.** (Presidential address delivered before the Royal Meteorological Society on 25 January 1950.) *Royal Meteorological Society, Quarterly Journal*, 76(328):115–124, April **1950. DWB**—A general talk on the development of amateur meteorological organizations, the recognition of research as part of work of Meteorological Office, and the part which the Royal Meteorological Society can play in future developments of official meteorology. *Subject Headings:* **Meteorological organizations, Royal Meteorological Society, Addresses, History.**

METEOROLOGICAL OBSERVATIONS AND INSTRUMENTS

OBSERVATIONS

7–7 551.501:551.509.3:656.6

Frankcom, C. E. N., **Weather wise,** Part I. *Marine Observer,* 20(147):29–36. Jan. **1950.** figs. Part II, *ibid.,* 20(148):74–81, April **1950.** fig., table. **DWB**—General discussion of meteorological training for seamen, observations and forecasting at sea. *Subject Headings:* **Marine meteorology, Training in meteorology.**

7–8 551.501.42:656.6

Newnham, E. V., **Conversion of percentage frequencies of fog and of sleet or snow to days per month at sea.** *Meteorological Magazine,* [London], 79(935):140–141, May **1950.** 3 tables. **DWB**—From actual data the average number of observations (at 6-hour intervals) per day of fog, snow or gale was found and related to percentage frequency of occurrence. This is used to give a conversion table; percentage frequency to days per month. *Subject Headings:* **Computation tables, Precipitation, Marine meteorology.**

7–9 551.501.45:681.14

Dewar, D., **Preparation of linear-function tables on a Hollerith tabulating machine.** *Meteorological Magazine,* [London], 79(935):137–140, May **1950.** 2 figs. **DWB**—In the Meteorological Office, London, upper-air temperatures in °F.+ 200 are punched on Hollerith cards. To obtain the mean for any month the total has to be divided by 11–31. For this, a printer-tabulator was used to construct a table of multiples of 100.0 to 300.0 by 11 to 31. *Subject Headings:* **Computation tables, Punch card methods.**

7–10 551.501.6:551.557:551.524.7

Matthewman, A. G., **Variation of geostrophic wind with potential temperature in the horizontal and in the vertical, with application to vertical cross-section diagrams.** *Meteorological Magazine,* [London], 79(934):97–102, April **1950.** fig., 2 tables, 6 refs., 8 equations. **DWB**—Derives mathematically a graphical method of constructing isopleths of geostrophic wind component perpendicular to vertical cross sections of the atmosphere. It is based on relation that rate of change of geostrophic component along the vertical is proportional to slope of isopleths of virtual potential temperature. The ordinate is the I.C.A.N. height; and a transparent scale, made to fit over M.O. Form 2815, is illustrated. An example of a vertical cross section from Sable Island to Vienna is shown. *Subject Headings:* **Geostrophic winds, Virtual temperature, Cross sections.**—*C.E.P.B.*

7–11 551.501.6:551.511:551.571

†Montgomery, R. B., **The Taylor diagram (temperature against vapor pressure) for air mixtures.** *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A,* 2(2–3):163–183, **1950.** 4 figs., 40 refs., 25 equations. Summary in English, German and French p. 163–164. **DWB, MH-BH**—A comprehensive presentation of the historical development and current application in meteorology, oceanography and air conditioning of *characteristic diagrams,* especially of that diagram, having temperature plotted against partial pressure of water vapor, which was introduced by G. I. Taylor and which is now called the *Taylor diagram.* A special modification of this diagram is described, wherein the ordinates are *potential* temperature and *potential* vapor pressure. This diagram is useful in calculations of samples of air mixtures obtained at different pressures over free water surfaces. A theoretical discussion of the properties of air mixtures, the characteristics of the air and water vapor constants entering into the equations on which the diagrams are based, is included. *Subject Headings:* **Physical constants, Taylor diagram, Nomograms.**—*M.R.*

7–12 551.501.7:551.557

Hartmann, Wilhelm, **Die Genauigkeit der Ermittlung des Höhenwindes aus den Karten der absoluten Topographie.** [The accuracy of the estimation of upper winds from charts of absolute topography.] *Annalen der Meteorologie,* 3(1–2):27–34, [Jan.–Feb.] **1950.** 3 figs. 3 tables, 8 refs. Summary in English p. 27. **DWB**—Theory and method of determining

gradient wind at a pressure level are described. "Observed" winds are obtained by pilot balloons; owing to variability of wind they are subject to irregularities of about 20–30° and 5m/s. Frequency curves of observed−gradient directions and observed−gradient and cyclostrophic speeds are given. The inclusion of a curvature term only improves accuracy when curvature is less than 500 km. (cyclones) or 1000 km. (anticyclones), owing to inertia of air in a changing pressure distribution. Mean differences average −5.4° and −2 km./hr. but the probable errors of the means are nearly as great. It is concluded that upper winds calculated from gradient are as accurate as observed winds. *Subject Headings:* **Baric topography, Upper wind measurements.**—*C.E.P.B.*

7–13 551.506.1 551.501.9(43)

*Germany. Deutscher Wetterdienst in der U.S. Zone. **Deutsches meteorologisches Jahrbuch US-Zone 1946.** [German meteorological yearbook US-Zone 1946.] Bad Kissingen, **1949.** 133 p. tables, 5 charts. **DWB**—The present volume, in addition to the usual monthly and annual mean values, contains a detailed listing of all first order stations in the U.S. Zone, with a description of the location, instrumental exposures, and the observational program at each. Also included are: a list of rainfall stations; daily observations for the entire year at Marburg, Munich and Zugspitze; phenological observations and charts for a number of locations; daily values of precipitation, snow depth (and in some cases water content of snow); sunshine observations (in some cases mean hourly values are given); data on intensity and duration of rain for heavy storms; and a catalogue of radiosonde observations made in the U.S. Zone (and Berlin) during 1946. This work was done under the supervision of Dr. Karl Knoch. *Subject Headings:* **Yearbooks, Observational data, Networks, Germany.**—*M.R.*

7–14 551.506.7:551.510.5

*Hess, Seymour L., **Some new mean meridional cross sections through the atmosphere.** *Journal of Meteorology*, 5(6):293–300, Dec. **1948.** 4 figs., 4 tables, 6 refs. **DWB**—The much denser network of upper air stations in North America especially in the Arctic, makes it possible to compile data for the construction of mean cross section charts of vertical temperature, potential temperature and geostrophic west wind, along actual meridians from the Arctic to the equator. Several new features appear, one being the separation of the Arctic from the Tropical tropopause in the region of the *jet stream.* Data are presented in both tabular and graphic form. *Subject Headings:* **Upper air observations, Atmospheric structure, Cross Sections.**—*M.R.*

INSTRUMENTS

7–15 551.508

Hall, Ferguson, **Communication theory applied to meteorological measurements.** *Journal of Meteorology*, 7(2):121–129, April **1950.** 8 figs., 19 refs., 18 equations. **DWB, MH-BH**—An analysis of techniques for measuring or communicating measurements of all kinds of meteorological variables. Frequency response, phase distortion, and linearity are discussed theoretically and illustrated graphically. Application to improvement of characteristics or design of meteorological instruments and recorders is fully discussed. *Subject Headings:* **Recording devices, Meteorological instruments.**—*M.R.*

7–16 551.508.5

†Noetzlin, Ulrich, **Beiträge zur Frage der Windmessung am Boden unter besonderer Berücksichtigung der Böenmessung.** [Contributions to the problem of measuring surface wind, with special regard to the measurement of squalls.] Berlin, [Germany], *Reichsamt für Wetterdienst, wissenschaftliche Abhandlungen*, Vol. 8, No. 5, **1941.** 78 p. 80 figs., 13 photos, 4 tables, 71 refs., 16 equations. **DLC, DWB**—A highly technical analysis of the performance of various types of cup and pressure anemometers, wind vanes, anemographs and electrical recorders. The Steffens-Hedde, Fuess, Askania, Lambrecht and other instruments are taken up individually and comparatively. Performance curves and data, and detailed drawings of the instruments and circuits make the work especially valuable. Important literature on the various aspects of the subject is reviewed. Special consideration is given to the structure of the wind, effect of changes in pressure and density on operation and recording of horizontal

wind speed, problems of long-distance recording, lag in instruments and circuits, etc. *Subject Headings:* **Anemometers, Wind instruments, Wind recorders.**—*M.R.*

7–17 551.508.53/

Corby, Robert E., **Acoustic anemometer-anemoscope.** *Electronics*, 23(1):88–90, Jan **1950.** 3 figs., 2 photos, equation. **DLC**—A device is described and illustrated (including wiring diagrams) which will indicate on a cathode-ray screen, as well as a recorder, a calm or an instantaneous wind vector from any direction. The sound head is exposed to the free flow of wind, and emits 60-cycle acoustical pulses which are received by four equally spaced listening posts oriented at the four cardinal points. When air is calm a spot appears in the center of the screen; if wind is blowing the reception at the four points will be timed with enough difference (in microseconds) to make an eccentric pattern on the screen. The displacement of the spot on the screen is proportional to the wind speed vector. *Subject Headings:* **Anemometers, Electronic recorders.**—*M.R.*

7–18 551.508.71:00

Petit, M., **Note sur l'utilisation pratique des hygromètres à baudruche.** [On the practical utilization of gut (gold beater's skin) hygrometers.] *Journal Scientifique de la Météorologie*, 2(5):19–25, Jan.–March **1950.** fig., table, ref., 5 equations. Summary in French, English and Spanish p. 19. **DWB**—Hygrometers made of "gut," or as is better known "gold-beater's skin," are more sensitive and accurate than are hair hygrometers; but certain precautions must be taken when seasoning and calibrating these hygrometers, which differ from the treatment ordinarily given radiosondes before release. Inertia corrections must be systematically employed. Equations, tables and a nomogram are given for making such corrections. *Subject Headings:* **Hygrometers, Radiosondes.**—*M.R.*

7–19 551.508.77

Rossi, Veikko, **Ein registrierender Schnee- und Regenmesser.** [A recording snow and rain gage.] *Geophysica, Helsinki*, 3:220–224, **1948.** 2 figs., 7 refs. **DWB, MH-BH**—An ordinary rain gage is of little use in Finland since snow, or snow and rain, occurs for seven months of the year. Various snow-rain gages are discussed critically (Ferguson, Hellmann, Fuess, Korhonen and Nilsson). The recording gage developed for use in Finland works on the weight principle, using petroleum to float the weights. There are four weights, the first one being released after 10 mm. is caught and each following weight after 1.5 mm. (*sic*) (records up to 50 mm.) Instrument, which is illustrated, was installed for comparative purposes at Ilmala in July 1947. The results of the tests in winter will be published after some irregularities are corrected. *Subject Headings:* **Snow-rain gages, Precipitation recorders, Finland.**—*M.R.*

7–20 551.507.32 551.508.822

Korff, S. A. and Hamermesh, B., **New cosmic ray radiosonde techniques.** *Franklin Institute, Journal*, 241(5):355–368, May **1946.** 7 figs., 2 refs. **DLC, DWB**—In order to carry heavy loads of cosmic ray and other aerological instruments to great heights, clusters of as many as 70 balloons were launched from the University of Chicago grounds. Construction of instruments, radio circuits, launching procedures, flight experience, recovery of equipment and other details of the program described and illustrated. *Subject Headings:* **Sounding balloons, Radiosondes, Cosmic ray instruments.**—*M.R.*

7–21 551.508.822

*Lugeon, Jean (ed.), I. **Breviaire des erreurs de radiosondage,** by Jean Lugeon and Paul Ackermann. [Summary of errors of radiosonde systems.] II. **La radiosonde suisse,** by Jean Lugeon, Paul Ackermann, Max Bohnenblust. [The Swiss radiosonde.] *La Station Centrale Suisse de Météorologie, Annales*, Zürich, **1948.** p. 1–30. 44 figs., tables, 39 refs. equations. **DWB**—Since eight different types of radiosondes are used in Europe (and three or four others elsewhere) the I.M.O. proposed that a comparison be made to determine accuracy of the various systems. As a first step, M. Lugeon discusses the mathematical or theoretical errors, the practical or instrumental errors in recording and computing pressure

temperature and humidity and the "aerological" errors, or those due to assumption as to pressure-height, rate of ascent, etc. Well illustrated with examples, tables and charts. The Swiss Radiosonde is discussed in detail in the second part, with profuse illustrations and schematic diagrams, and a consideration of magnitude of errors. Conclusion is that maximum error would be +2 mb. and minimum error <1.5 mb. The author favors charts showing pressure/altitude instead of contours on a pressure surface. *Subject Headings:* **Radiosonde errors, Switzerland.**—*M.R.*

7–22 551.508.822 551.521.1

*Väisälä, Vilho, **Solar radiation intensity at the ascending radiosonde.** *Geophysica*, 3:39–55, 1948. 9 tables, 4 refs., 45 equations. **DWB, MH-BH**—In 1941 the author published a paper (**Der Strahlungsfehler der finnischen Radiosonde,** *Mitt. Met. Inst. Univ. Helsinki*) which presented the calculated radiation error of the Väisälä radiosonde assuming a constant radiation intensity in the stratosphere. Since this assumption is not warranted, especially when the sun is at a low angle, the author has gone through careful calculations of the air mass which a beam would traverse at different solar angles and air pressures before striking the instrument. These computed values are represented in tables and as isopleths on charts. A polytropic troposphere (up to 200 mb.) and an isothermal stratosphere (from 200 to 10 mb.) and a constant relative humidity of 50% in the stratosphere is assumed. After computing water mass at various levels from 1000 to 250 mb., and extinction of radiation intensity by pure air, the author calculates the extinction and absorption by water vapor. *Subject Headings:* **Solar radiation, Radiosonde errors.**—*M.R.*

SYNOPTIC ANALYSIS AND FORECASTING

7–23 551.509.2(04)

Wood, C. A., **For better or worse?** *Weather*, 5(4):147–148, April **1950. MH-BH**—Complaints about recent changes in form and cost of the *Daily Weather Report* issued by the Meteorological Office. *Subject Headings:* **Weather reports, Great Britain.**

7–24 551.509.3:551.577

§Rao, D. V., Sarma, V. Vittal, and Lal, S. S., **Studies on forecasting local rainfall in India with the help of precipitation index.** *Indian Journal of Meteorology and Geophysics*, 1(2):105–115, April **1950.** 3 figs., 7 tables. **DWB, MH-BH**—Radiosonde data for Madras, New Delhi and Nagpur have been analyzed by Schell's statistical method ($I=\Sigma w/L$) and the results presented in tables and graphs. It is concluded by each of the authors, working independently, that this method will greatly increase the accuracy of 12 hour forecasts for certain sections of India, especially at times of high or low index values. Results differ among the three stations and from the results of Schell for New England, but this can be accounted for by differences in intensity and type of precipitation. Usually the index gives a guide to the amount or intensity of rainfall. The few cases which proved outstanding failures are examined and explained either synoptically or by the fact of heavy showers having just ended at the time of the radiosonde ascent. *Subject Headings:* **Single station forecasting, Objective forecasting, Rainfall forecasting, Radiosonde data, India.**—*M.R.*

7–25 551.509.31:551.575.1

Berkofsky, Louis, **An objective determination of probability of fog formation.** *American Meteorological Society, Bulletin*, 31(5):158–162, May **1950.** 4 figs., 2 refs., equation. **DWB, MH-BH**—Methods used previously in forecasting rainfall or thunderstorms, applied to fog forecasting. Any number of parameters can be used, but in this study the probability of fog occurring during the night is determined from 6 elements observed at sunset, taken in pairs. (Wind speed vs. dew point depression, stability vs. wind shear, and dew point gradient vs. tenths of low cloud cover.) The three computed probabilities are then plotted and the forecast probability taken from this (linear) curve. Verification shows a fair success, but could be improved by selecting the *best* parameters. *Subject Headings:* **Objective forecasting, Fog forecasting.**—*M.R.*

7–26 551.509.31(02)

Flohn, Hermann, Scherhags **"Neue Methoden der Wetteranalyse und Wetterprognose" und die Entwicklung der dreidimensionalen Synoptik.** [Scherhag's "New methods of weather analysis and weather forecasting" and the development of three-dimensional synoptics.] *Meteorologische Rundschau*, 3(1–2):19–27, Jan.–Feb. 1950. tables, 34 refs. **DWB**—A long analysis and appreciation of Scherhag's book (see *item* 1–52, *Meteorological Abstracts and Bibliography*, Jan. 1950) as the most fruitful investigation from the synoptic point of view. Includes: stratospheric compensation; weather analysis; weather forecasting; remaining unsolved problems. Thermodynamic analysis of individual ascents must become spatial; analysis takes too long; further formulation of rules from similar cases and from statistical analysis of pressure changes is required. *Subject Headings:* **Weather forecasting, Synoptic analysis, Prognostic charts, Textbooks.**—*C.E.P.B.*

7–27 551.509.532:551.524.36

Franssila, Matti, **On the forecasting of frost with Ångström's formula.** *Geophysica, Helsinki*, 3:102–113, 1948. fig., 3 tables, 3 refs., 6 equations. **DWB, MH-BH**—Using surface observations from Malmi airport (on the north coast of the Gulf of Finland, 60°15′N) and aerological data from Ilmala, the author applies Ångström's formula ($t_m = C_1 t_1 - C_0 t_0 - k$) and comes to the conclusion that: (a) the use of aerological measurements does not appreciably improve the accuracy of frost forecasts, (b) the minimum temperature is practically independent of temperature variations in the air mass, (c) the value of k in the above formula depends mostly on cloudiness and wind speed and hence the problem is mainly to forecast those two elements for the next night, and (d) if the air mass does not change, the use of psychrometer readings taken at 0800, 1400, 1700 or 2000 leads to no significant differences in accuracy of forecast of minimum temperature for the following morning. (See paper by Angervo, item 7–66, which seemingly contradicts the basic conclusions of this paper.) *Subject Headings:* **Frost forecasting, Minimum temperatures, Finland.**—*M.R.*

7–28 551.509.67

Vonnegut, Bernard, **Experiments with silver iodide smokes in the natural atmosphere.** *American Meteorological Society, Bulletin*, 31(5):151–157, May 1950. 10 figs., 9 refs. **DWB**—Description of seeding experiments carried out from an airplane on Dec. 21, 1948, using silver iodide and dry ice alternately. Photographs of top of stratus deck after seeding show results. Preliminary experiments at tracing silver iodide smokes and ground released smokes, and apparatus used in dispensing chemicals for seeding purposes, also described. *Subject Headings:* **Cloud seeding, Silver iodide.**—*M.R.*

STRUCTURE AND PHYSICS OF THE ATMOSPHERE

STRUCTURE OF ATMOSPHERE

7–29 551.510(02)

†Raethjen, Paul, **Kurzer Abriss der Meteorologie; dynamisch gesehen. Teil I. Konstitution der Atmosphäre.** [Brief outline of meteorology from a dynamic viewpoint. Part I: Constitution of the atmosphere.] Hannover, Wolfenbütteler Verlagsanstalt, **1947.** 100 p., 35 figs., 2 tables, 50 refs., 126 equations. (*Bücher der Mathematik und Naturwissenschaften*) **DLC**—The first of a series of three texts by the same author on the **Dynamics of the Atmosphere.** The second part will be called "*Wärmehaushalt der Atmosphäre*" or [Heat economy of the atmosphere], and the third part "*Zirkulationen der Atmosphäre.*" The present volume comprises a very detailed treatment of the vertical structure of the atmosphere; changes induced by adiabatic movements or vertical motion; effects of the earth's motion, etc., ignoring friction; influence of friction and "austausch"; disturbances in the "balance" and origin of the atmospheric circulation; stability and lability; and finally cyclogenesis on frontal surfaces (waves). Amply illustrated with schematic diagrams. Contains a list of 29 references cited plus 21 more references to noteworthy texts, classified into six categories. *Subject Headings:* **Dynamic meteorology, Atmospheric structure, Textbooks.**—*M.R.*

7–30 551.510.41:551.515.8

Buch, Kurt, **Der Kohlendioxydgehalt der Luft als Indikator der meteorologischen Luftqualität.** [Air's carbon dioxide content as indicator of meteorological quality of the air.]

Geophysica, Helsinki, 3:63–79, 1948. 3 figs., 5 tables, 11 refs. **DWB, MH-BH**—Research on relation between atmospheric composition and meteorological conditions began in 1921 when Finnberg made regular analyses of quantity of nitrogen in the atmosphere, with negative results. Tests of CO_2 content were made in 1932 north of Iceland, and related to air masses by Erik Palmén. Later (1935), tests were made over the Atlantic from Skagen to Boston and New York to Copenhagen; in 1936 from Narvik to 80°45′N, 12°53′E, and from Sept. 1933 to 1935 in Petsamofjord. Results of these analyses show that *extreme arctic* air has the least CO_2 and *continental* and *tropical* air the most. The mean values are the following:

	$cm^3/10l$
Arctic air of high latitudes:	2.23
Arctic air	3.04–3.08
Maritime air (North and the middle part of Atlantic Ocean)	3.14–3.31
Continental and tropical air	3.26–3.66

Also CO_2 increases from spring to autumn, and there has been a 10% increase in the past 35 years (average 2.82 to 3.22). The result of measurements of the change of CO_2 with altitude in a mass of continental polar air, which stayed 36 hours over the sea surface, are as follows:

Height	0.3	1.5	4	8	30 meters
Quantity CO_2	3.07	3.12	3.12	3.14	3.29 $cm^2/10l$

Subject Headings: **Atmospheric composition, Atmospheric pollution, Carbon dioxide, Air masses.**—*M.R.*

7–31 551.510.52:551.524.7:551.547.3

†*Hoinkes, H., **Die interdiurnen Änderungen von Druck und Temperatur in der unteren Troposphäre bis 5 km Höhe und ihre gegenseitigen Beziehungen in statistisch-synoptischer Betrachtungsweise.** [Diurnal variations of pressure and temperature in the lower troposphere up to 5 km. and their contrasting relations from a statistic-synoptic viewpoint.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A*, 2(2–3):239–304, **1950.** 21 figs., 10 tables, 212 refs., equations. Summary in German and English p. 239–240. **DWB, MH-BH**—The author gives a statistical evaluation of homogeneous records from 70 stations, distributed in area from the North Atlantic to inner Asia and from Spitzbergen to North Africa. The results are discussed, and concern the vertical structure of isallobaric areas, the compensation of high pressure variations in the lower troposphere, the lee effect, the nature of ground pressure variations and cyclogenesis. It is concluded that within the limits of accuracy of statistical investigations, the various mutual relations between variations of pressure and temperature in the lower troposphere can be accounted for by the varying conditions in the lower troposphere according to the land-sea distribution which in one case allows compensation of upper pressure variations and in another does not. A great deal of statistical data is presented in tables and on mean charts for North Atlantic area and Europe. *Subject Headings:* **Structure of troposphere, Compensation, Pressure changes, Diurnal variations.**—*M.R.*

7–32 551.510.535 551.515

*Burkard, O., **Studie zur weltweiten Ionosphärenstörung vom 15. März 1948.** [Study of the world-wide ionospheric disturbance on March 15, 1948.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A*, 2(2–3):314–324, **1950.** 4 figs., table, 8 refs., equation. Summary in German, English and French p. 315–316. **DWB, MH-BH**—Data from 30 magnetic stations in all parts of the world are analyzed (for the strong disturbance of March 15, 1948). Not all stations showed a decrease in the critical frequency. Former theories are revised to show dependence on magnetic field of earth and on local, not universal time. *Subject Heading:* **Atmospheric disturbances.**—*M.R.*

7–33 551.510.535:551.524.7

Burkard, O., **Thermische Aufspaltung ionosphärischer Schichten.** [Thermal separation of ionospheric layers.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A*, 2(2–3):308–314, **1950.** 3 figs., 2 refs., 15 equations. Summary in German, English and French p. 308–309. **DWB, MH-BH**—An investigation into the causes of the ionospheric layers,

considering vertical temperature, pressure and radiation distribution which is known or assumed at present. Mathematical calculations lead to conclusion that splitting is due to thermal considerations, but theory is not in complete harmony with observations. *Subject Headings:* **Ionospheric layers, Upper air temperatures.**—*M.R.*

MECHANICS AND THERMODYNAMICS

7–34 551.511

Dedecker, P., **Sur les équations approchées de la dynamique atmosphérique.** [On the approximate equations of atmospheric dynamics.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A*, 2(2–3):223–238, **1950.** fig., 10 refs., 19 equations. Summary in French, German and English p. 223–224. **DWB, MH-BH** —Hydrodynamic equations used in meteorology are only valid up to 10 meters. Equations are developed which apply up to 500 km. and can be used for studying isobaric or geopotential charts. Highly theoretical treatment giving approximate equations which, through successive transformations of coordinates, can be applied in various special cases with little loss in accuracy. *Subject Headings:* **Dynamics of the atmosphere, Hydrodynamics.**—*M.R.*

7–35 551.511 551.501.3

Dési, F., (Budapest), **Über das Gleichgewicht eines gesättigten Luftteilchens.** [On the equilibrium of a saturated air particle.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A*, 2(2–3):305–307, **1950.** table, 3 equations. Summary in German and English p. 305. **DWB, MH-BH**—A precise theoretical analysis leads to the presentation of a corrected table for equilibrium of a saturated air particle between temperature of −10° and 40°C. *Subject Headings:* **Dynamics of the Atmosphere, Physical constants.**—*M.R.*

7–36 551.511 551.515.3

*El-Fandy, M. G., **Dust—an active meteorological factor in the atmosphere of northern Africa.** *Journal of Applied Physics*, 20(7):660–666, July **1949.** 6 figs., 4 tables, 12 refs. 13 equations, append. **DLC**—A theoretical discussion of the role of dust particles in the turbulent transfer of heat and moisture, in the development of convection, and in upsetting the radiation balance and thus modifying the air masses over desert regions. Data obtained in Egypt and North Africa are used to support theory. Rate of settling, effect on visibility transfer of dust up to 3,000 ft. or more by ordinary surface winds, etc. taken into consideration. It is stated that the dust carries heat aloft and creates its own convection by giving up heat rapidly to surrounding air, and by absorbing direct and scattered radiation. *Subject Headings* **Dust storms, Turbulent exchange, Radiational balance, North Africa.**—*M.R.*

7–37 551.511:551.551

Lettau, Heinz, **Isotropic and non-isotropic turbulence in the atmospheric surface layer.** *U. S. Air Force Cambridge Research Laboratories, Geophysical Research Papers*, No. 1, Dec. **1949.** 86 p. 24 figs., 10 tables, 26 refs., 100 equations. **DWB, MH-BH**—An important and thoroughgoing contribution to present knowledge of turbulence, micrometeorology and problems of energy exchange in the surface layers. Several chapters are devoted to a review of theories and definition of the terms and parameters and setting up the basic equations for isotropic and non-isotropic turbulent flow. (Surface layer; the three basic parameters: vertical mixing length (l), horizontal friction velocity *Schubspannungs-Geschwindigkeit*, and vertical mixing velocity; and eddy stress, austausch coefficient, etc.) Deficiencies in theory and measurements are mentioned as fields for further study.

A new dimensionless number has been defined, which differs slightly from Richardson's number (which assumes "just no turbulence"). The wind profile is then expressed by a formula which reduces to the logarithmic law for adiabatic conditions. This new theory explains the dependency of the basic factors on the heat flux or on temperature lapse rate although it is proven that the roughness parameter z_0 does not depend on thermal stratification. Diurnal variations of the meteorological elements and turbulent fluctuations in the surface layer are also explained by this new simplified theory.

In the final chapters the theory developed by the author is applied to turbulent heat flux as a constituent of the heat balance of the ground—specifically testing data obtained by Haude

in the Gobi Desert, by Sverdrup in the Arctic (Spitzbergen), and to the moisture exchange considerations of Thornthwaite and Holzman. Lastly the formation of radiation fog is considered in the light of the theory.

The paper includes a large number of useful graphs or nomograms, as well as definitions of terms and quantities in a mathematical and a descriptive manner. *Subject Headings:* **Turbulence theory, Micrometeorology, Energy exchange.**—*M.R.*

7–38 551.511:551.515.4(43)

*Weixlederer, R., **Über den Zusammenhang zwischen Labilitätsenergie und Gewitterbildung in den Nordalpen.** [On the relation between lability energy and thunderstorm formation in the northern Alps.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A*, 2(1):119–126, **1950.** fig., 3 tables, 7 refs. Summary in German, English and French p. 119. **DWB, MH-BH**—Analysis of radiosonde flights made at Friedrichshafen and Lake Constance in the summer of 1947 shows that there is a distinct although not consistent relation between amount of energy available for convection, and thunderstorm frequency in the Tyrolese region of the Alps. Many thunderstorms occur when the flights show negative areas and vice-versa, but such exceptions can be explained on the basis of cyclonic or anticyclonic conditions, orographic influences, etc. Some ranges have thunderstorms nearly every day in summer, yet when the positive area is over 1,000 mm² (on the chart) thunderstorms are almost certain throughout the area. The diurnal variation in thunderstorm frequency is presented for four categories: thermal and frontal thunderstorms with positive and negative lability, respectively. Frontal storms with positive areas showed no diurnal variation, but the other three types showed distinct afternoon or evening maxima.

Frequency of days with thunderstorm activity at various hours.

Hour	0–3	3–6	6–9	9–12	12–15	15–18	18–21	21–24
W+	3			2	5	11	12	11
W−	1				1	8	10	12
F+	3	3	5	5	4	5	4	5
F−	6	8	7	4	14	18	12	12

W = Thermal thunderstorm F = Frontal thunderstorm

Subject Headings: **Thunderstorm frequency, Instability, Thermodynamics of the atmosphere, Alps, Germany.**—*M.R.*

GENERAL CIRCULATION

7–39 551.513:551.524.2

Ångström, A., **Atmospheric circulation, climatic variations and continentality of climate.** *Glaciers and Climate. Geografiska Annaler*, 31(1–4):316–320, **1949.** fig., 6 refs., equations. **MH-BH**—From distribution of effective radiation reaching earth's surface and observed temperature t, author finds expression $t = \text{const.} - 20.10^3 R^2/AH \sin^2 \phi$ where R is radius of earth, A is horizontal eddy conductivity and H height of atmosphere in which it takes place. $A = 1.4 \times 10^7$ [c.g.s. units]. From this, author calculates variation of temperature with latitude for different values of A. Taking above value as unit equivalent eddy conductivity, the latter is a measure of maritimity in any locality. In a local region air transport across isotherms is also important, but over a hemisphere it nearly cancels out. *Subject Headings:* **Atmospheric circulation, Temperature variations, Continentality.**—*C.E.P.B.*

7–40 551.513

*Hutchings, J. W., **A meridional atmospheric cross section for an oceanic region.** *Journal of Meteorology*, 7(2):94–100, April **1950.** 3 figs., 5 tables, 3 refs. **DWB**—Based on radiosonde data for 1943–1947 at a dozen stations in the Southwest Pacific, summer and winter means of upper-air temperature and wind (at standard heights to 20+ km.) and heights of principal isobaric surfaces have been compiled and are presented in the form of tables or mean cross sections along the 170th meridian E. The cross sections show the maximum west-wind field (jet stream) to be in the zone where the tropical tropopause (16 km.) overlaps the polar tropopause (10–12 km.). *Subject Headings:* **Upper air temperatures, Jet stream, Tropopause, Cross sections, Southern Hemisphere, Southwest Pacific.**—*M.R.*

7–41. 551.51

§Namias, Jerome, **The index cycle and its role in the general circulation.** *Journal of Meteorology*, 7(2): 130–139, April 1950. 8 figs., 4 tables, 10 refs. **DWB, MH-BH**—Discussion of problem of stability of high or low zonal-index in winter, in the light of aerological data accumulated during the past decade. Obviously, since the zonal index is a derived and not a primary parameter, it cannot be forecast until the more elementary conditions (accumulation of cold air in the Arctic, confluence, etc.) are understood. This paper attempts to show, by means of 5-day mean 700 mb. and other charts and data, how such a mechanism might arise as would account for month to month and year to year variations in zonal flow. *Subject Headings:* **Zonal index, General circulation.**—*M.R.*

7–42 551.513:550.3

Wulf, Oliver R. and Hodge, Mary W., **On the relation between variations of the earth's magnetic field and variations of the large-scale atmospheric circulation.** *Journal of Geophysical Research* 55(1):1–20, March 1950. 13 figs., 2 tables, 21 refs. **DWB**—An attempt to show that since changes in the atmospheric circulation from day to day produce prominent changes in the magnetic records at nearby observatories, there should be some relation between average monthly pressure patterns (as reflecting the mean circulation) and the mean monthly magnetic character-figure C_A (0–24 h.) or the mean daily geomagnetic index K_{ch}. Atmospheric influence is also evident in the daily variation of declination at Tucson, Arizona during the period 1940–1945. The analysis is further extended to show the seasonal behavior of the intermonthly pressure changes in the major centers of action of the Northern Hemisphere (Azores high, Aleutian low, etc.), in relation to geomagnetic activity. *Subject Headings:* **Magnetic storms, Atmospheric circulation.**—*M.R.*

7–43 551.513.1:551.557

Goldie, A. H. R., **A fundamental property of atmospheric circulation.** *Nature, London* 165(4195):481–482, March 25, 1950. **DWB**—Horizontal air-mass transport (ρv) reaches a maximum at about 8 km. The letter shows that in an isothermal atmosphere Δp reaches a maximum just below 8 km. and in an adiabatic atmosphere at about 10½ km.; in a large scale circulation the height would be intermediate. Various questions are posed about the consequences of this. *Subject Heading:* **Atmospheric circulation.**—*C.E.P.B.*

7–44 551.513.1:551.578.4

Leighly, J., **On continentality and glaciation.** *Glaciers and Climate. Geografiska Annaler* 31(1–4):133–145, 1949. 3 figs., 2 tables, 5 refs. **MH-BH**—Discusses variation of precipitation, snowfall and ablation across a mountain range fronting the sea. This is applied to present climate along 49°N. of North America and shown to agree with southern limit of ice sheets. Author then discusses synoptic conditions favorable to snow in the interior by tabulating departures from mean circulation index in months with more than twice and less than half normal snowfall, and shows that a situation giving a flow of air from S is favorable and in prairies a component from E as well. Suggests that a general change to low index patterns, e.g., a glacial anticyclone in NE, is favorable to glaciation of Canada. *Subject Headings:* **General circulation, Snowstorms, Canada, North America.**—*C.E.P.B.*

ATMOSPHERIC DISTURBANCES

7–45 551.515.2 525.63

§Leet, Lewis Don, **Causes of catastrophe; earthquakes, volcanoes, tidal waves, and hurricanes.** New York, Whittlesey House, McGraw-Hill, [1948]. 232 p. numerous figs., charts, photos, tables. **DLC**—A popular interpretation of geophysical theory and facts, with many schematic diagrams and photographs of scenes in connection with major disasters; reproductions of records, weather charts, etc. Chapter 7, **Hurricanes and Typhoons,** (p. 188–214) contains a discussion of many aspects of hurricane formation, movement, structure, wind speeds, tides and a detailed account of the New England hurricane of 1938, with six figures illustrating various features of the above. Tidal waves are discussed in chapter 6, (p. 169–187). *Subject Headings:* **Hurricanes, Tidal waves, Popular works, New England.**—*M.R.*

7–46 551.515.2:551.587

§Palmén, Erik, **On the formation and structure of tropical hurricanes.** *Geophysica, Helsinki*, 3:26–38, **1948.** 10 figs., 5 refs., equation. **MH-BH**—The author analyzed radiosonde data for the Caribbean area and found that instability of the convective or conditional type extends through much deeper, thicker layers than in extratropical regions. Charts of the North Atlantic area, showing difference between temperature of air lifted adiabatically from sea surface and that of surrounding air at the 300 mb. level, gives a clue to the strong tendency toward hurricane formation in the western Atlantic during summer and autumn, and the inability for hurricanes to develop during winter or in the east Atlantic. The vertical structure of hurricanes is studied and illustrated by a synoptic-aerological analysis of the Sept. 17, 1947 hurricane. The warm core is explained dynamically. *Subject Headings:* **Hurricanes, Upper air climatology, Synoptic-aerological studies, Caribbean, North Atlantic.**—*M.R.*

7–47 551.515.2

Yeh, Tu-cheng, **The motion of tropical storms under the influence of a superimposed southerly current.** *Journal of Meteorology*, 7(2):108–113, April **1950.** 4 figs., table, 7 refs., 25 equations. **MH-BH, DWB**—The motion of a tropical storm is studied from the point of view of the internal forces and of external influences such as the trade winds, the approach of a trough in the westerlies, etc. It is shown that the vortex would move in a circular path were it not for external forces, but that actually an oscillatory motion, depending on the size and depth of the storm and on the wind speed of the external current, develops. Four possible trajectories are computed and shown for the recurvature of a storm after it enters a southerly current. *Subject Headings:* **Tropical cyclones, Steering.**—*M.R.*

7–48 551.515.3

§Tepper, Morris, **A proposed mechanism of squall lines: the pressure jump line.** *Journal of Meteorology*, 7(1):21–29, Feb. **1950.** 15 figs., table, 16 refs. **DWB, DLC, MH-BH**—A squall line (May 16, 1948) was studied by means of an analysis of pressure traces and other meteorological records made in the micrometeorological network near Wilmington, Ohio. One-minute synoptic maps are presented to show the nature of the waves of pressure and changes in wind field. The theory is developed that the pressure jump is caused by accelerations set up by the cold front and propagated as a wave on the inversion at a speed more rapid than that of the squall. Behind the jump comes a rarefaction wave at an even more rapid speed, and this mechanism eventually destroys the jump wave. It is suggested that tornadoes form where two jump lines interact. *Subject Headings:* **Line squalls, Pressure jump, Tornadoes.**—*M.R.*

7–49 551.515.4:551.594.21

†Wichmann, Heinz, **Grundprobleme der Physik des Gewitters.** [Fundamentals of thunderstorm physics.] *Physikalische Forschung*, No. 1:1–118, **1948.** 63 figs., numerous tables, 60 refs. (Wolfenbüttel, Germany, Wolfenbütteler Verlagsanstalt) **DPL, DLC**—A detailed and well illustrated treatment of the technical problems connected with the dynamics of thunderstorms and thunderstorm electricity, with the greatest emphasis on the latter aspect. Among the particular subjects treated are: vertical motions, thunderstorm probability with varying surface and aerological conditions, lability, vertical currents (methods of measurement, estimation from energy diagrams, actual speed of vertical motion and critical speeds for thunderstorm formation); colloidal processes in cumulus clouds and precipitation formation (sublimation, nucleation, supercooling, electrical processes connected with freezing); the electrical field in the vicinity of a thundercloud (measurements at the ground and in the cloud); the zero isotherm (relation to precipitation and electric fields in fair weather cumulus, shower and thunderclouds); the cause of lightning (effect of surface features); the influence of lightning on the electric field (cloud strokes, ground strokes and comparison with laboratory strokes); variations in the earth's field as a consequence of cloud fields and discharges; atmospherics due to thunderstorm activity, etc. Most of the important theories of local and general application are reviewed and sources cited. *Subject Headings:* **Thunderstorm dynamics, Thunderstorm electricity, Lightning.**—*M.R.*

7–50 551.515.4(471.1)

Oksanen, Kaino W., **Die Gewitter in Helsinki.** [Thunderstorms at Helsinki.] *Geophysica, Helsinki*, 3:93–101, **1948.** 6 figs., 3 refs. Summary in English p. 100–101. **DWB, MH-BH**—Statistics on thunderstorm frequency for 1845–1847 and 1881–1947 are analyzed and discussed. Variations from year to year, month to month, day to day and hour to hour, as well as average duration in hours, and wind direction before and after the thunderstorm are presented for Helsinki (70 years) and Ilmala (37 years). Thunderstorm frequency does not follow strictly the daily or annual temperature regime since there are lags in incidence of moist air advection after the time of temperature maximum. Most thunderstorms move into Helsinki from WSW quadrant, but surface winds are usually SE or S before and W to N after the storm. *Subject Headings:* **Thunderstorm frequency, Finland.**—*M.R.*

7–51 551.515.8

Papež, Antonín, **Fronty.** [Fronts.] *Meteorologické Zprávy*, 3(4–5):70–72, Feb. **1950.** 4 figs. **DWB**—Elementary discussion of fronts. *Subject Heading:* **Fronts.**

7–52 551.515.827:551.524.7

*Collmann, Wolfgang, **Troposphärische Mitteltemperaturen der Hauptluftmassen über Nordwestdeutschland.** [Troposphere mean temperatures of the principal air masses over Northwest Germany.] *Annalen der Meteorologie*, 3(1–2):20–25, [Jan.–Feb.] **1950.** 2 figs., 3 fold. plates. Summary in English p. 20. **DWB**—Mean temperatures at 1000, 900 . . . 300, 225 mb. levels were calculated from radiosondes at Emden-Rysum and Hamburg for Jan., March, July, Oct., 1940–45, for continental and marine facies of arctic, cool and warm temperate, and tropical air. Tables give means, extremes and standard deviations, mean lapse rates and relative topographies. Frequency diagrams for Jan. and July at 700 mb. show that classification by temperature alone is not usually practicable. *Subject Headings:* **Air masses, Upper air temperatures, Northwest Germany.**—*C.E.P.B.*

7–53 551.515.827

Uhlig, Siegfried, **Vertikalschnitte durch Fronten.** [Vertical sections through fronts.] *Meteorologische Rundschau*, 3(1–2):27–30, Jan.–Feb. **1950.** 5 figs., 8 refs. **DWB**—European examples of five types of front are selected and vertical sections to 500 mb. of weather, cloud and virtual moist-potential temperature are shown, also charts of surface pressure, fronts, precipitation area and 500 mb. topography. Types: (1) Upglide [Aufgleit] front with severe night thunder, Aug. 6, 1939; (2) Shear [Schlief] zone similar to (1) but isobars less crowded, April 27, 1939; (3) Shear zone with cold air and new subtropical air, Nov. 18, 1940; (4) Intrusive warm front, Aug. 25, 1938; (5) Upglide warm front, Oct. 31, 1941. *Subject Headings:* **Frontal structure, Cross sections.**—*C.E.P.B.*

RADIATION AND TEMPERATURE

RADIATION

7–54 551.521

*Lunelund, Harald and Nordström, Svante, **Über die Himmelsstrahlung in Finnland.** [On radiation of the sky in Finland.] *Geophysica, Helsinki*, 3:80–88, **1948.** 5 figs., 6 tables, 8 refs. Summary in English p. 87. **DWB, MH-BH**—The relation between diffuse and total radiation for clear days at different solar heights is discussed and illustrated by means of tables and charts. Measurements of short wave radiation were begun at Rovanieme (66°30′) in 1927 and at Jämsö (61°52′) and Raivola (60°15′), as well as Helsinki, using Cadmium-cell photometers. Results for northern and southern Finland compared. In 1934 UV-dosimeter measurements were made at Ilmala and Dalsvik (in and near Helsinki), giving for the first time the relative intensity of ultraviolet sky radiation in Finland, agreeing favorably with measurements made at Berlin, Potsdam, etc. *Subject Headings:* **Sky radiation, Ultraviolet radiation, Finland.**—*M.R.*

7–55 551.521:551.311.182

Sauberer, Franz, **Die spektrale Strahlungsdurchlässigkeit des Eises.** [The spectroscopic transparency of ice.] *Wetter und Leben*, 2(9–10):193–197, March **1950.**

	Transparency, % per meter						% per cm.				
mμ	313	350	450	550	650	750	800	800	1000	1100	1200	1300
	Clear lake ice						Ice				
	90	95	95	88	71	34.5	17	97	73	85	22	19
	Distilled water						River water				
	—	(95)	99.6	96.5	71.4	9	11.1	98	66	82	21	32

Transparency of clear ice to infrared difficult to measure, but generally agrees with that of water. *Subject Heading:* **Optical properties of ice.**—*C.E.P.B.*

7–56 551.521.1:551.511

Haurwitz, B., **Relations between solar activity and the lower atmosphere.** *American Geophysical Union, Transactions*, 27(2):161–163, April **1946.** ref. **DWB**—During solar flares only slight changes in the solar constant take place, but the total energy received in the UV section of the spectrum is vastly increased. This increase would produce marked increases in temperature in the ozone layer (20–40 km. heights), producing significant changes in zonal or meridional flow. The mechanism whereby these changes would effect the pressure and circulation of the troposphere is tentatively suggested, in order to stimulate further research and accumulation of necessary observational data in those critical levels. *Subject Headings:* **Atmospheric circulation, Ozone layer, Solar influences.**—*M.R.*

7–57 551.521.1 551.508.2

Paulsen, H. Schieldrup, **Investigations carried through at the Station of Forest Meteorology at Os. I. On radiation, sunshine, and cloudiness.** *Universitetet i Bergen, Årbok 1948, Naturvitenskapelig rekke*, No. 7, [**1949**]. 44 p. 19 figs., 9 tables, 34 refs., 15 equations. In English. **MH-BH**—A detailed theoretical and empirical analysis of radiation data obtained during the summers of 1944 and 1945 at Os, 30 km. south of Bergen. About 20% of the sky (to the north) was covered by trees. Instruments (Robitzsch actinograph, Moll-Gorczyński solarimeters and UV dosimeter) are described in detail and comparisons with records made at Stockholm given. Numerous scatter diagrams and graphs show respectively the relation between global radiation and altitude of sun on clear and overcast days, between global radiation and duration of sunshine, between cloudiness and duration of sunshine, between various cloud types and global radiation. Others show the influence of cloud albedo, effects of ultraviolet radiation in all its aspects, and finally the daily values of global radiation for the period of record. *Subject Headings:* **Solar radiation, Radiation measurement instruments, Norway.**—*M.R.*

7–58 551.521.4 551.594.5

Seaton, S. L., **Night sky brightness at College, Alaska.** *Journal of Geophysical Research*, 55(1):43–46, March **1950.** 2 figs., 3 refs. **DWB**—Measurements made during February 1949 by means of a low brightness photometer, on the very few nights when auroral activity was absent, gave values as low as 70 mμL (near the zenith) and 180 mμL (at the horizon). During auroras the values range up to 40,000 mμL. Curves show decrease of zenith sky brightness after sunset on April 7 and 9, 1949, respectively. *Subject Headings:* **Light of the night sky, Auroras.**—*M.R.*

7–59 551.521.64:551.547.3

Lindholm, F., **Atmospheric effects on cosmic radiation, air-mass absorption and meson decay.** *Tellus*, 2(1):63–67, Feb. **1950.** 4 figs., 2 tables, 10 refs., equations. **DWB**—At Stockholm it was found that 24 hour means of cosmic radiation vary by ±5% over long period means. The bulk of this variation is due to atmospheric effects. Mesons are produced at about the 100 mb. layer, but radiosonde data seldom goes above 200 mb. Enough correlation was found between pressure and rate of decay of mesons during the passage of two cyclones, to warrant use of meson decay data for determining the height of the 200 mb. layer. Con-

clusions regarding effect of latitude in relation to meson decay and slope of 96 mb. pressure surface are drawn from Scherhag's data. *Subject Headings:* **Constant pressure surface, Cosmic radiation, Sweden.**—*M.R.*

TEMPERATURE

7–60 551.524.3

Weickmann, Helmut, **Singularitäten der Temperatur nach den Beobachtungen der Societas Meteorologica Palatina auf dem Hohenpeissenberg.** [Singularities of temperature on the Hohenpeissenberg according to the observations of the Societas Meteorologica Palatina.] *Meteorologische Rundschau*, 1(17–18):517–519, Nov.–Dec. 1948. 3 figs., 3 tables, 3 refs. **DWB**—*Subject Headings:* **Temperature singularities, Germany.**

7–61 551.524.34:551.311.12(485)

Wallén, C. C., **The shrinkage of the Kårsa Glacier and its probable meteorological causes.** *Glaciers and Climate. Geografiska Annaler*, 31(1–4):275–291, **1949.** 7 figs., 3 tables, 24 refs. **MH-BH**—Between 1917 and 1947 Kårsa Glacier (Riksgränsen, Sweden) retreated 200 meters, with great loss of material. Analysis shows that this was due to increased ablation caused by greater heat supply from the air and a more maritime climate in winter but more continental in summer. These prolonged the oblation season. The climate has also become more variable and southerly winds have increased in frequency. *Subject Headings:* **Temperature variations, Glaciers, Sweden.**—*C.E.P.B.*

7–62 551.524.35

Reidat, R., **Zum jährlichen Gang des Einsatzes der Temperaturanomalien.** [On the annual variation of the setting-in of temperature anomalies.] *Wetter und Klima*, 2(5–6):151–157, May–June **1949.** 2 figs. **DWB**—From 80-year series of monthly temperatures for nine stations author tabulates monthly frequency of beginnings of runs of same sign of anomaly. Maximum frequency in west Germany is in June and December when temperature gradients are greatest, and some months after the most rapid change of solar radiation. *Subject Headings:* **Temperature anomalies, Germany.**

7–63 551.524.35

Tollner, Hans, **Der Winter 1948/49 in Österreich.** [Winter of 1948/49 in Austria.] *Geographische Gesellschaft, Wien, Mitteilungen*, 91(1–6):58–60, **1949. DLC**—This season was remarkable for high temperatures, little cloudiness and precipitation, and a long growing season. *Subject Headings:* **Abnormal winters, Austria.**

7–64 551.524.36 551.524.32(471.1)

*Keränen, J., **The mean and extreme values of temperature at the main stations of Finland.** *Geophysica, Helsinki*, 3:56–62, **1948.** 6 figs., tables, ref. **MH-BH**—A detailed analytical study of the daily, monthly and annual variations in the various temperature elements based on data from twelve stations in Finland with from 30 to 115 years of records. *Subject Headings:* **Temperature variations, Finland.**—*M.R.*

7–65 551.524.36(43)

Mämecke, Karlheinz, **Häufigkeits- und Mittelwerte in der Temperaturreihe von Berlin (1851–1930).** [Frequencies and mean values in the temperature series of Berlin (1851–1930).] *Meteorologische Rundschau*, 3(1–2):34–35, Jan.–Feb. **1950.** fig., 4 tables, 2 refs. **DWB**—Discusses 80-year means for each day of year (366 values). Annual frequency shows maxima at 1 and 19°C. Monthly and seasonal frequencies also given. *Subject Headings:* **Temperature frequencies, Berlin, Germany.**—*C.E.P.B.*

7–66 551.524.37:551.509.53

§Angervo, J. M., **Zur Frage der Einwirkung absteigender Luftbewegungen auf die Sommernachtfröste.** [On the question of the influence of descending currents on radiation frost in summer.] *Geophysica, Helsinki*, 3:114–122, **1948.** 6 figs., table, 2 refs. Summary in English p. 122. **DWB, MH-BH**—Aerological and synoptic data for three days on which heavy

radiation frost occurred in southern Finland (May 3, 4 and 19, 1947) are analyzed and discussed from the point of view of the theory advanced by Johansson in 1913. It was found that subsidence (upper inversions) was present in the arctic air over Scandinavia in every case, and the consequent low humidities (shown for soundings at Helsinki, Stockholm, Archangel, Riga, etc.) resulted in increased outgoing radiation and severe frost as seen from table of minimum temperatures at 12 stations. *Subject Headings:* **Subsidence, Frost forecasting, Finland.**—*M.R.*

7–67 551.524.7:551.510.52

*Defant, F., **Das mittlere meridionale Temperaturprofil in der Troposphäre als Effekt von vertikalen und horizontalen Austauschvorgängen und Kondensationswärme.** [The mean meridional temperature profile in the troposphere as an effect of vertical and horizontal "Austausch" processes and heat of condensation.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A*, 2(2–3):184–206, **1950.** 4 figs., 5 tables, 15 refs., 55 equations. Summary in English and French p. 184. **DWB, MH-BH**—The theoretical vertical temperature distribution in the troposphere (based on Taylor, Schmidt and Ertel) is compared with the observed (based on Northern Hemisphere data compiled by Palmén, Wagner and Ramanathan prior to 1939) and the difference shown to be small up to 10 km. The actual profile is determined by: (a) radiation balance of the earth's surface, which is fairly well-known, (b) horizontal and vertical heat exchange (austausch), and (c) condensation in the troposphere which releases heat. The amount of energy transport through moisture is considered theoretically. Scanty data (Meinardus and Wüst) on mean meridional precipitation is used to develop the cross section up to the tropopause. *Subject Headings:* **Temperature profiles, Turbulent exchange, Structure of troposphere.**—*M.R.*

7–68 551.524.7

McIntyre, D. P., **On the air-mass temperature distribution in the middle and high troposphere in winter.** *Journal of Meteorology*, 7(2):101–107, April **1950.** 9 figs., 8 refs., equation. **DWB**—Radiosonde data for Tatoosh Island, Santa Maria, Churchill, Penzance, Aldergrove, Lerwick and other stations in the North American or Atlantic area were analyzed to determine the frequency with which specified temperatures occurred at various constant pressure surfaces (700, 500, 400 or 300 mb.) Double maxima were found in the histograms for the lower levels where a baroclinic field lies over the station, and a single maximum at stations or levels where the field or air mass is homogeneous. [The characteristics attributed to polar or tropical air masses might as easily have been attributed to *continental* or *maritime* air respectively (it seems strange to read of a preponderance of *tropical* air over Tatoosh). Also the greater uniformity attributed to frequency of temperatures in tropical air would be expected when that air comes from a homogeneous ocean surface like the eastern Pacific.] Lapse rates are analyzed for the 700–500 mb. layer; the skewness of the temperature histograms discussed and the use of median rather than mean values recommended for representation of upper-air data. *Subject Headings:* **Upper air temperatures, Air masses, North America.**—*M.R.*

EARTH TEMPERATURE

7–69 551.525

Benfield, A. E., **The temperature in an accreting earth.** *American Geophysical Union, Transactions*, 31(1):53–57, Feb. **1950.** 17 refs., 5 equations. **MH-BH**—The cooling effect of decrease in radioactivity as the earth grows older, and the warming effect of compression in the interior, in respect to changes in the surface and the deep interior temperatures over some billions of years, are estimated, and theoretical, as well as quantitative aspects considered. *Subject Headings:* **Earth temperatures, Planetary climates.**—*M.R.*

7–70 551.525

Weger, Nikolaus, **Bodentemperaturen in Beeten verschiedener Form und Richtung.** [Earth temperatures in mounds of different shapes and direction.] *Meteorologische Rundschau*, 2(9–10):291–295, Sept.–Oct. **1949.** 5 figs., 2 tables. **DWB**—Daily variation of temperature at 5 cm. in mounds (elongated and circular) and ridges, 18 cm. high, and in furrows in gravel soil compared with level ground. In fine weather mounds and ridges had a

higher day temperature by up to 6°C. and lower night temperature by 2–3°C. giving a net gai of heat greatest for north-south ridges. Furrows had lower day temperatures. In unsettle and rainy weather difference was less. Applications in agriculture and microclimatology *Subject Headings:* **Earth temperatures, Microclimatology.**—*C.E.P.B.*

7–71 551.525.

Knighting, E., **A note on nocturnal cooling.** *Royal Meteorological Society, Quarterl Journal*, 76(328):173–181, April **1950.** 2 figs., 27 formulas. **DWB**—Brunt (1939) calculate fall of temperature of ground surface on a clear radiation night, on the assumption that all hea is supplied by the ground, as 11°C. Frost (1948) finds 15.6°C. If heat is supplied by bot ground and air, using numerical constants given by Brunt and Frost, author calculates coolin as 6.3°C. which is too low compared with observed values (ca. 9°C.) He considers tha Frost's turbulence parameter a is too large; using a revised value he calculates cooling as 10°C The value of the method is doubtful owing to the difficulty of estimating some of the pa rameters. *Subject Headings:* **Nocturnal cooling, Earth temperatures.**

7–72 551.525.

Guild, W. R., **Note on heat transfer at the soil surface.** *Journal of Meteorology*, 7(2):140- 144, April **1950.** 4 figs., 12 refs., 4 equations. **DWB, MH-BH**—Heat balance and edd diffusion as determined from data obtained at night under desert conditions (in Arizona) Marked correlation exists between eddy diffusivity and wind speed. Convective term ac counts for as much as half of the net transfer; hence cannot be ignored. *Subject Headings* **Radiational cooling, Turbulent exchange, Eddy diffusion, Arizona.**—*M.R.*

ATMOSPHERIC PRESSURE AND WIND

PRESSURE

7–73 551.576.2:551.54

Bampa, M. and Melis, L., **Sulla correlazione fra nuvolosita e tendenza barometrica** [On the correlation between nebulosity and barometric tendencies.] *Rivista di Meteorologi Aeronautica*, 9(2):46–47, April–June **1949.** 3 refs., equations. **MH-BH**—Results of a sta tistical study on the correlation between cloud amount and tendency of surface pressure chang using data from the Lido di Roma (March–May 1934–1943). Correlation fairly good fo meteorology, but not phenomenal. *Subject Headings:* **Cloudiness, Pressure changes.**—*M.R.*

7–74 551.543.3(469.9

Kletter, L., **Gesetzmässige Luftdruckschwankungen im Bereich des Azorenhochs wäh rend des Spätwinters 1947/48.** [Regular variations of air pressure in the region of the Azore during the late winter of 1947/48.] *Archiv für Meteorologie, Geophysik und Bioklimatologie Ser. A*, 2(2–3):325–333, **1950.** fig., 5 tables, 11 refs., equations. Summary in Germa English and French p. 325. **DWB, MH-BH**—From author's abstract. An attempt to prove by means of harmonic analysis (pressure changes at Funchal and Madeira), that the Azore High has an oscillatory regime which is centered on a point of symmetry. Among othe cycles, the 36 day pressure wave was the most pronounced (at least in the late winter o 1947/48). *Subject Headings:* **Harmonic analysis, Azores High, Symmetry points, Pressur variations.**—*M.R.*

WIND

7–75 551.55:551.46

Munk, Walter H., **On the wind-driven ocean circulation.** *Journal of Meteorology*, 7(2):79- 93, April **1950.** 9 figs., 3 tables, 26 refs., 36 equations. **DWB**—The general features, an even some of the particular features of water circulation in the various oceans, can be explaine on the basis of the wind stress *curl* rather than the wind stress vector. The differential equatio of mass transport is solved and integrated to give the stream lines and water movements i the major *gyres* in the North and South Atlantic and Pacific and the Indian Oceans, respectively The transport in the zone of westerlies is specially treated, and though calculated transport fo the Gulf Stream is only half of the observed, the discrepancy is thought due to erroneous calcula

tion of stresses at low wind speeds. The California current is taken up in detail with respect to this theory. Finally, a classification of all ocean currents in connection with the major zonal and meridional wind systems is presented, and the major differences between Northern and Southern Hemisphere circulations discussed. *Subject Headings:* **Wind effects, Ocean currents.**—*M.R.*

7–76 551.55:551.465

Wind and ocean currents. *Nature, London,* 163(4137):237–238, Feb. 12, **1949.** **DWB**—Summary of discussion on this subject Nov. 26, 1948 in rooms of Royal Astronomical Society, Dr. A. T. Doodson, Chairman. *Subject Headings:* **Wind effects, Ocean currents.**

7–77 551.556:551.46:532.59

Kapitsa, P. L., **K voprosu ob obrazonaniĭ vetrom morskikh voln.** [On the question of the formation of wind waves at sea.] *Akademiia Nauk, SSSR, Doklady,* 64(4):513–516, **1949.** 5 refs. **DWB**—Consideration of difference of pressure on two sides of a wind-wave gives theoretical results close to the experimental. *Subject Headings:* **Wind waves, Oceanography.**

7–78 551.556:551.46:532:59

Neumann, Gerhard, **Die Meeresoberfläche als hydrodynamische Grenzfläche und das Windfeld über den Wellen.** [The sea surface as a hydrodynamic boundary and the wind field over waves.] *Annalen der Meteorologie,* 2(5–6):156–164, May–June **1949.** 4 figs., 3 tables, 10 refs. **MH-BH**—Roughness parameter of sea is calculated to be much greater with light than strong winds. Logarithmic law of wind speed with height above sea gives speeds too high below 100 cm., but holds for log $(z+H)$ where H is wave height. Author then discusses pressure and wind fields for different models of wave structure and finds that the log law no longer holds near the boundary surface. A distinction is made between "roughness" and "waviness." *Subject Headings:* **Wind waves, Oceanography.**—*C.E.P.B.*

7–79 551.556:551.46:532.59

Neumann, Gerhard, **Die Enstehung der Wasserwellen durch Wind.** [Generation of water waves by wind.] *Deutsche Hydrografische Zeitschrift,* 2(5):187–199, Oct. **1949.** 7 figs., 6 tables, 11 refs., 23 equations. Summaries in German and English p. 187–188. **DWB**—Consideration of classic theories of relation between pressure, resistance, wave length and height; calculation of generation and growth of initial waves with time, (in shallow water, etc.) based on energy dissipation. Minimum wind velocity for formation of waves far lower than that computed by Jeffreys, but agreeing with Russell's observations (wind velocity of 90 cm/sec.) give initial wave lengths of 2 to 5 cm. In shallow water lengths are smaller for higher velocities. Examples worked out and illustrated schematically. *Subject Headings:* **Wind waves, Hydrodynamics, Oceanography.**—*M.R.*

7–80 551.558(083.3)

Kiveliovitch, M., **Sur la composante verticale du vent.** [On the vertical component of wind.] *Journal Scientifique de la Météorologie,* 2(5):26–31, Jan.–March **1950.** 2 refs., 9 equations. Summary in French, English and Spanish p. 26. **DWB, MH-BH**—A continuation of the article abstracted in the March issue of *Meteorological Abstracts and Bibliography,* (item 3–95) wherein the accelerations formerly assumed to be negligible are appreciable. In a later article, corrections to the equation of continuity and the thermodynamic equation will be introduced. *Subject Heading:* **Vertical motion.**—*M.R.*

7–81 551.515.4:551.558.1

Bunker, Andrew F., **Fluctuations of the vertical component of the wind associated with the outflow of cold air from a thunderstorm.** *American Meteorological Society, Bulletin,* 31(5):178–180, May **1950.** 2 figs., 2 refs. **DWB, MH-BH**—In studying turbulent exchange at Woods Hole Oceanographic Institution, simultaneous records of air temperature and speed, direction and angle of inclination of wind were made during a thunderstorm. Vertical velocities presented along with other records made 5 meters above water of harbor (July 28, 1949). *Subject Headings:* **Vertical velocities, Thunderstorms, Woods Hole, Massachusetts.**—*M.R.*

7–82 551.577.2:551.558.1

*Sil, J. M., **Relationship between vertical currents and intensity of precipitation.** *Indian Journal of Meteorology and Geophysics*, 1(1):52–58, Jan. **1950.** 4 tables, 3 refs. **DWB**—Using data obtained from radiosonde ascents at Poona, and applying the formulas developed by Fulks and Holmboe, the rate of precipitation has been calculated for various vertical velocities in the saturated layers. From an integration of these rates in the several standard layers (800 mb. to 400 mb.), a total unit rate is derived which when applied to actual rates of fall for short periods during 211 showers (in 35 thunderstorms) permits a table of average and maximum vertical speeds to be compiled. The highest speed was 5.7 m./sec. (12.7 m./h.) June 22, 1945. Precipitation intensities during the showers from 1939 to 1944 are tabulated. (Maximum 5.5 in./hr.) *Subject Headings:* **Precipitation intensities, Vertical velocities, Thunderstorm rainfall, India.**—*M.R.*

AQUEOUS VAPOR AND HYDROMETEORS

CLOUDS

7–83 551.574.1

Facy, L., **Les noyaux artificiels de congélation.** [Artificial freezing nuclei.] *Journal Scientifique de la Météorologie*, 2(5):7–18, Jan.–March **1950.** 6 figs., tables, 12 refs., equation. Summary in French, English and Spanish p. 7. **DWB, MH-BH**—Nearly insoluble nuclei (such as silver iodide), and hygroscopic nuclei (such as sodium, magnesium, aluminum chlorides or lead iodide) are discussed in detail in relation to the temperature at which freezing occurs automatically (−20 to −35°C.) on various sizes and concentrations of nuclei. The mechanism by which freezing occurs and the size and shape distribution of several of these kinds of minute nuclei are discussed and beautifully illustrated by means of electron-microscope photographs (figs. 1–5). *Subject Headings:* **Freezing nuclei, Hygroscopic nuclei.**—*M.R.*

7–84 551.574.1(083.3) 551.576.11:001.5

Kiveliovitch, M. and Roulleau, J., **Sur l'évolution des gouttes d'eau dans l'atmosphère.** [On the evolution of water drops in the atmosphere.] *Journal Scientifique de la Météorologie*, 2(5):1–6, Jan.–March **1950.** 3 refs., 8 equations. Summary in French, English and Spanish p. 1. **DWB, MH-BH**—A theoretical study of various aspects of growth of water drops in clouds: diffusion of water vapor, heat balance and conductivity of air in the vicinity of a drop; leading to a generalized equation for the time-rate of growth of a drop. *Subject Headings:* **Cloud physics, Drop accretion.**—*M.R.*

7–85 551.574.1

Pollermann, M., **Die Tröpfchenbildung an Ionen in der Wilsonschen Nebelkammer.** [Formation of droplets on ions in the Wilson condensation chamber.] *Annalen der Physik*, 6 Ser. 5(6–8):329–348, **1950.** 24 figs. **DWB**—During expansion of a Wilson chamber, electrical mobility of ions was continuously measured and occurrence of spontaneous droplet formation followed. The mobility of ions and critical supersaturation for positive ions agreed with Volmer's theory. Greatest supersaturation reached did not cause condensation on negative ions. *Subject Heading:* **Condensation nuclei.**—*C.E.P.B.*

7–86 551.574.1:532.77

Schulz, Gerhard, **Der Einfluss von Fremdkörpern auf die Unterkühlungsfähigkeit des Wassers.** [The influence of foreign substances on the super cooling capacity of water.] *Meteorologische Rundschau*, 1(7–8):237–241, Jan.–Feb. **1948.** fig., 7 tables, 5 refs. **DWB**—As a result of experiments conducted during 1942–1944 at the Cloud Research Laboratory of the Reichsamt für Wetterdienst, tables showing the upper and lower limits of the freezing point of water containing various solid or gaseous impurities, are presented. The apparatus used is described and illustrated. The conclusion is that the artificial freezing nuclei must be of the same general crystalline structure as ice and must have freshly exposed surfaces to be effective. Size of nuclei is of no consequence but presence of air in the water aids ice formation. Sand and dust from various sources were tested. Findeisen succeeded in producing virga

artificially from supercooled water clouds, (1–9°C.) by seeding with the finest powdered sea sand. *Subject Headings:* **Supercooled water, Freezing nuclei, Cloud seeding.**—*M.R.*

7–87 551.576.1

Das, P. K., **The growth of cloud droplets by coalescence.** *Indian Journal of Meteorology and Geophysics*, 1(2):137–144, April **1950.** 5 figs., table, 5 refs., 7 equations, append. **DWB, MH-BH**—The "collection efficiency" of large drops approaching various sizes of small drops in a cloud, is calculated and presented in tables and graphs. The results show higher per cent values of accumulation than the data computed by Langmuir (*Journal of Meteorology*, 5(5), **1948**) who took into account the aerodynamic deflection of small drops ahead of a moving large drop, but not the variation in size of small drops as Das did in this study. Work based on assumption of Findeisen (*Meteorologische Zeitschrift*, 56, **1939**) and Schumann (*Royal Meteorological Society, Quarterly Journal*, 285, **1940**) that collision of cloud drops leads to coalescence, and on work of G. I. Taylor and M. Glavert on collection efficiency of aerofoils, assuming that the small drops obey Stokes' Law. *Subject Headings:* **Cloud physics, Drop accretion.**—*M.R.*

7–88 551.576.11

Wittmann, Hans, **Bemerkenswerte Wolkenbeobachtungen über dem Watzmann.** [Remarkable cloud observations over the Watzmann.] *Meteorologische Rundschau*, 3(3–4):75–76, March–April **1950.** 3 figs. **DWB**—Watzmann Mountain 2,713 m. high in Bavaria has a very steep slope to E.S.E. behind which a lee cloud forms. With NW winds typical lenticular cloud forms over peak at 4000 m., repeated in wave form at equal distances downwind. On April 13, 1939 there was repeated formation and dissolution of wave-form clouds in maritime tropical air from NW. *Subject Headings:* **Cloud formation, Orographic effects, Bavaria.**—*C.E.P.B.*

RAINFALL

7–89 551.577.2(969)

Leopold, Luna B., **The annual rainfall of East Maui.** Hawaiian Sugar Planters' Association, Experiment Station, **1949.** 17 p. 6 figs., 3 tables, 10 refs. (Reprint from the second issue 1949 of *Hawaiian Planters' Record*, published by the Experiment Station, Hawaiian Sugar Planters' Association.) **DWB**—An adjusted isohyetal chart was compiled from rainfall data obtained from 116 gages (one for every four square miles) on east Maui; one of the Hawaiian Islands. Average annual rainfall varies from 16 inches to over 400 inches and elevations from sea level to 10,000 ft. Ratios between stations along various cross sections were tested, and variations in the ratios during any period explained on the basis of changes in atmospheric stability. Five stations having records for 1907–1948 were used as a base for adjustment, in preparation of the large chart included as a fold-in in this report. Study was made to serve as an important method of revising payments for irrigation water, used by sugar plantations. *Subject Headings:* **Rainfall distribution, Maui, Hawaii.**—*M.R.*

7–90 551.577.22

Brooks, C. E. P., **Relation between number of days with 0.4 in. or more of rain and total rainfall.** *Meteorological Magazine*, London, 79(935):152–153, May **1950.** table. **DWB**—Note on article by E. V. Newnham (*Meteorological Magazine* Jan. **1950**). Days with 0.4 in. or more = Rainfall (in.) − c, where c varies from 6 to 12. Correlation coefficients 0.98. In British Isles, days with 0.2 in. or more = 1.5R + 6. *Subject Heading:* **Rainfall distribution.**

7–91 551.577.32

Johannsen, Hans Hinnerk, **Singularitäten in einer 50 jährigen Niederschlagsreihe.** [Singularities in a 50-year rainfall record.] *Meteorologische Rundschau*, 2(5–6):168–171, May–June **1949.** graph, 4 tables, 8 refs. **DWB**—Data for Moisburg (Este Valley) 1891–1944 were analyzed for singularities in amount, days and intensity of rain in daily means for two 25-year periods; thunder and snow, are also discussed. A number of persistent singularities were found and causes discussed. *Subject Headings:* **Precipitation variations, Singularities.**—*C.E.P.B.*

7–92 551.577.32:551.515

Maede, Hans, **Über den jährlichen Gang und die Ergiebigkeit von Regenwetterlagen, dargestellt am Beispiel von Greifswald.** [Annual variation and rainfall of rainy-weather situations, as exemplified by Greifswald.] *Zeitschrift für Meteorologie*, 3(3):80–84, March **1949.** 3 figs., 3 tables. **DWB**—A rainy situation is a day with at least 1 mm. rain (1697 in 5,478 days 1925–1939). Eight synoptic situations are distinguished: steering from west, northwest, north, showery, south and southeast types, depression, thundery. Monthly and annual frequencies, intensities and amounts of rainfall are given for each type. *Subject Headings:* **Precipitation variations, Synoptic climatology, Greifswald, Germany.**—*C.E.P.B.*

7–93 551.577.32:551.583.13

Zimmermann, Gerhard, **Die Erhaltungstendenz der Anomalie in der Jahressumme des Niederschlags.** [The persistence of the anomaly in the annual amount of precipitation.] *Meteorologische Rundschau*, 1(17–18):530–531, Nov.–Dec. **1948.** fig., 9 refs. **DWB**—*Subject Headings:* **Precipitation anomalies, Persistence.**

7–94 551.577.37

Beck, F. X., **Grösste Tagesmengen des Niederschlags in Karlsruhe.** [Greatest daily rainfalls in Karlsruhe.] *Wetter und Klima*, 2(5–6):157–161, May–June **1949.** 8 tables. **DWB**—Gives normal rainfall, number of days, frequencies of maximum daily amount etc., for 1888–1937. *Subject Headings:* **Excessive precipitation, Karlsruhe, Germany.**

7–95 551.577.37

Fabricius, A. F., **Das Regenunwetter in Schleswig-Holstein Ende August 1946.** [The rainy bad weather in Schleswig-Holstein at the end of August 1946.] *Zeitschrift für Meteorologie*, 3(4):116–118, April **1949.** 2 figs., table. **DWB**—Twenty-four hour rainfall of 177 mm. on 26–27 of August. Extensive flooding. *Subject Headings:* **Floods, Schleswig-Holstein.** —*C.E.P.B.*

SNOW

7–96 551.508.7 551.578.46

Klein, G. J., **Canadian survey of physical characteristics of snow-covers.** *Glaciers and Climate. Geografiska Annaler*, 31(1–4):106–124, **1949.** 14 figs., 2 tables, 5 refs. **MH-BH**—A weekly and daily survey of physical character of snow cover at 10 stations in 1947 is described. Instruments are illustrated for measuring snow temperatures, specific gravity, free water content, average grain size and shape, and hardness. Survey gives a fairly clear picture of snow conditions on exposed areas across Canada. Curves of variation of depth shown. *Subject Headings:* **Snow sampling instruments, Snow cover, Canada.**—*C.E.P.B.*

7–97 551.578.46(410)

Manley, G., **The snowline in Britain.** *Glaciers and Climate. Geografiska Annaler*, 31(1–4):179–193, **1949.** 4 figs., 27 refs. **MH-BH**—From snow drifts on Ben Nevis and in neighboring countries, change of temperature and number of days of snow cover with height, author estimates that snow line on Ben Nevis would now lie about 1,615 meters, having risen by about 90 m. from 1884–1903. Height of summit 1,343 m. Considers that necessary conditions for glaciation have only occurred in odd years since A.D. 1690 and there were probably no true glaciers after 6800 B.C. Occurrence of late-glacial glaciers in Britain is discussed. *Subject Headings:* **Snow cover, Glaciation, Great Britain.**—*C.E.P.B.*

7–98 551.578.46

Steinhäusser, Hans, **Normalhöhen zur Kennzeichnung der Schneedeckenverhältnisse.** ["Normal heights" as an indication of snow-cover conditions.] *Meteorologische Rundschau*, 3(1–2):32–34, Jan.–Feb. **1950.** 2 figs., 2 tables, 7 refs. **DWB**—The average date of occurrence of maximum depth of snow is retarded towards summer at increasing height, the rate above 1,200 m. being almost linear at 4½ days per 100 m. Between 900 and 1,200 m. it changes little. The duration, date of maximum depth and date of beginning are averaged to give

"normal height" at each station. A table is given for stations in eastern Alps. *Subject Headings:* **Snow cover, Alps.**—*C.E.P.B.*

7–99 551.578.41:621.396 551.588.5

Saxton, J. A., **Reflection coefficient of snow and ice at V.H.F.** *Wireless Engineer*, 27(316):17–25, Jan. **1950.** 13 figs., table, 10 refs., 22 equations, 2 append. **DLC**—Discussion of the nature and composition of snow, the dielectric properties of snow, land and sea at 30, 300, 3,000 and 30,000 Mc/s, and the effects of multiple reflection phenomena in changing the vertical-coverage diagram of a very high frequency radio transmitter. Reflection coefficients for plane waves under the above conditions given in equations, tables and nomograms. *Subject Headings:* **Radio transmission, Topographic effects, Snow.**—*M.R.*

CLIMATOLOGY AND BIOCLIMATOLOGY

CLIMATOLOGY

7–100 551.582(265)(267)

Maher, J. V. and Riley, P., **Weather in Australian waters.** *Marine Observer*, 20(148):105–115, April **1950.** 6 figs., ref. **DWB**—General description of winter and summer weather, tropical cyclones, willy-willies and Cocos Island cyclones, and weather service to shipping. Cyclone tracks, barograms and mean air temperature January and July. *Subject Headings:* **Climatology, Southwest Pacific, Indian Ocean.**

7–101 551.582:551.583:551.590.21(437)

Thraen, August, **Das Klima von Prag, im Zeitrahmen einer 89jährigen Säkularwelle ausgeglichen** (1856–1944). [The climate of Prague adjusted to the period of an 89-year secular wave (1856–1944).] *Meteorologische Rundschau*, 2(11–12):323–324, Nov.–Dec. **1949.** 2 figs., 2 refs. **DWB**—"Climate" is not absolute but refers to period of time considered. Author selects Köppen's 89-year period and shows annual variation of pressure, temperature and rainfall in relation to sun height and variation in sunspot cycle in March to June (continental rain period) and August to February (sea rain period) showing opposite effects. *Subject Headings:* **Climatology, Climatic variations, Solar influences, Prague, Czechoslovakia.**—*C.E.P.B.*

7–102 551.582.1(7)

§Longley, Richmond W., **North American weather.** *Weather*, 5(5):167–171, May **1950.** 3 figs. **DWB**—Popular account of instability storms, frontal storms (illustrated by 3 representative charts) and temperature changes. *Subject Headings:* **Climatology, North America.**

7–103 551.582.2(4)

Thraen, August, **Jahresperiode des Europa-Klimas im Rahmen der 89jährigen Säkularwelle (1856–1944).** Die 6 Haupt-Typen für Niederschlag, Temperatur und Luftdruck. [Annual period of European climate in the 89-year cycle (1856–1944). The 6 main types in precipitation, temperature and pressure.] *Meteorologische Rundschau*, 3(3–4):76–78, March–April **1950.** 2 figs. **DWB**—Gives monthly histograms for Stykkisholm, Copenhagen, Berlin, Prague, Geneva, Lisbon for means of rain (mm./day, Angot's coefficient, frequency of amount exceeding daily average), temperature and pressure. *Subject Headings:* **Climatology, Periodicities, Europe.**—*C.E.P.B.*

CLIMATIC CHANGES

7–104 551.583(98)

Hennig, R., **Die Erwärmung der Arktis.** [The warming of the Arctic.] *Wetter und Klima*, 2(1–2):49–51, Jan.–Feb. **1949.** **DWB**—*Subject Headings:* **Climatic variations, Arctic.**

7–105 551.583:551.482

Hjulström, F., **Climatic changes and river patterns.** *Glaciers and Climate. Geografiska Annaler*, 31(1–4):83–89, **1949.** 8 refs., equation. **MH-BH**—*Subject Headings:* **Climatic changes, Rivers.**

7–106 551.583.1:551.583.2

Helland-Hansen, B., **Remarks on some variations in atmosphere and sea.** *Glaciers and climate. Geografiska Annaler,* 31(1–4):75–82, **1949.** 3 figs., ref. **MH-BH**—Comparison of long records (tree-rings, etc.) shows that variations of climate differ in different regions. Correlation between temperature and solar constant positive where isotherms bend poleward, negative where they bend equatorward. Temperature and salinity of eastern North Atlantic have increased since 1914; both deep water and air temperatures are related to atmospheric circulation. *Subject Headings:* **Climatic variations, Dendrochronology.**—*C.E.P.B.*

7–107 551.583.1:63

†Hustich, I., **On the correlation between growth and the recent climatic fluctuation.** *Glaciers and Climate. Geografiska Annaler,* 31(1–4):90–105, **1949.** 12 figs., 3 tables, 55 refs. **MH-BH**—A general discussion of the effect of changing climate on tree growth and crop yield, especially in North Finland. Variability increases northward. Effect of temperature on growth increases polewards, that of precipitation increases equatorward. Trends in growth of cereals, tree growth, lake levels etc. in recent years show that conditions have become more favorable in high north latitudes, less so in lower latitudes; there is direct opposition between growth of pine in Lapland and Oregon. *Subject Headings:* **Climatic variations, Dendrochronology, Agricultural meteorology.**—*C.E.P.B.*

7–108 551.583.3(6)

†Nilsson, E., **The pluvials of East Africa; an attempt to correlate pleistocene changes of climate.** *Glaciers and Climate. Geografiska Annaler,* 31(1–4):204–211, **1949.** 4 figs., 34 refs. **MH-BH**—Gives a detailed correlation of glacial and post-glacial stages in northern Europe and North America with pluvial stages in Palestine, Egypt, British East Africa and Abyssinia, showing agreement of glacial and pluvial stages. Changes of lake level in Faiyum depression shown for comparison and dating. A more general correlation table includes also Himalaya and Alps. Well documented. *Subject Headings:* **Climatic changes, Quaternary climates, Lakes, East Africa.**—*C.E.P.B.*

MICROCLIMATOLOGY

7–109 551.584:63(43)

*Mäde, Alfred, **Die Agrarmeteorologie in der Pflanzenzüchtung; ein Bericht über Arbeiten der Agrarmeteorologischen Forschungsstelle Müncheberg (Mark) des Reichsamts für Wetterdienst.** [Agrometeorology in plant cultivation; a report on the work of the Müncheberg (Mark) Agrometeorological Research Station of the Government Weather Service.] *Berlin, [Germany], Reichsamt für Wetterdienst, wissenschaftliche Abhandlungen,* Vol. 9, No. 6, **1942.** 47+p. 35 figs., 10 photos, 11 tables, 14 refs. **DLC**—The microclimatic installation at the Erwin-Baur Institute at Müncheberg (Brandenburg) is described and a detailed drawing and photographs of the layout shown. The development and calibration of instruments, the details of horizontal and vertical temperature and wind variations over various crops and topography, the interrelation between the micro- and macro-circulations, and the effect of artificial aids (greenhouses, shelters, etc.) on the microclimate, are all treated systematically and the discussion amply supported by pages of data and profiles, scatter diagrams, charts and photographs. *Subject Headings:* **Microclimatology, Agricultural meteorology, Germany.**—*M.R.*

7–110 551.584:631.4 551.525.5(47)

Shul'gin, A. M., **K voprosu o melioratsii pochvennogo klimata v altaiskom krae.** [On the problem of the amelioration of soil climate in the Altai area.] Akademiia Nauk, SSSR, *Pochvovedenie,* (1):54–56, Jan. **1949.** 5 refs. **DLC**—Brief account of work done in the Altai regions, based on observations at the Barnaul meteorological station, and the survey of soil climates made by the Dept. of Climatology and Soil Science of the Altai Agricultural Institute. Some of the peculiarities noticed were: temperatures down to −40°C. at the beginning of winter when the snow cover is thin (10–15 cm.) result in an early and deep freezing of soil. Snow cover is uneven, resulting in great variations in soil temperature during the winter. For example on Feb. 3, 1943 at 3 cm. depth with no snow cover temperature was −43.1°, under

16 cm. snow −20° and under 58 cm. snow only −8°C. Conclusion is that accumulation of an even snow cover would create an homogeneous and more humid soil climate. *Subject Headings:* **Soil climatology, Frozen soil, Snow cover, Altai, U.S.S.R.**—*M.R.*

7–111 551.584:631.4:63(47)

Spirhanzl, J., **Sovětské názory o půdní Klimatologii.** [Soviet views on soil climatology.] *Meteorologické Zprávy*, 3(4–5):80, Feb. **1950. DWB**—Agroclimatological research began in the Soviet Union in the early 1930's, with particular attention being paid to soil climatology. The investigations of Koloskov, Dokochayev, Williams, Shul'gin, Adamov and others are mentioned. A classification of soil climates according to *actual* moisture and temperature conditions, and according to annual *variations* in humidity and temperature, has been introduced. References are given to some of the basic research papers in this field. *Subject Headings:* **Soil climatology, Agricultural meteorology, U.S.S.R.**—*M.R.*

7–112 551.584:631.4:63(09)(47)

†Shul'gin, A. M., **Sovremennye zadachi izucheniia klimata pochv v svete ideĭ Dokuchaeva-Vil'iamsa.** [Contemporary problems in the study of soil climate according to the ideas of Dokuchaev and Williams.] Akademiia Nauk, SSSR, *Pochvovedenie*, (1):591–596, Oct. **1949.** 19 refs. **DLC**—Historical background of present day soil climatology, going back to Dokuchaev (1892) who organized eight meteorological stations while attempting to create forests in the steppe, and his assistant, Adamov, who wrote [*The temperature of the Chernozem*]. Conclusion that atmospheric climatic conditions are not identical with soil climatic conditions, led to many studies on the latter, but as yet there is little factual data, and only occasional work by meteorologists (Woeikoff) and agroclimatologists (Koloskov). Problems of reclamation and climatic amelioration discussed. Soil climates classified according to humidity and temperature *means*, and according to humidity and temperature *variations* during the year. *Subject Headings:* **Soil climatology, Agricultural meteorology, History, U.S.S.R.**—*M.R.*

7–113 551.584.31(43)

Aichele, Heinz, **Kleinklimatische Untersuchungen am Wartenberg.** [Microclimatic investigations on the Wartenberg.] *Meteorologische Rundschau*, 3(1–2):15–18, Jan.–Feb. **1950.** 13 figs. **DWB**—Wartenberg is a round basalt hill 150 m. above surrounding 670 m. plateau between Black Forest and Swabian Alps. A meteorograph was carried round and up and down on various tracks. Results shown by profiles. Night cold layer at foot is 5–10 m. deep in summer and up to 50 m. in winter on clear nights; peak averages 5°C. warmer than foot. Vertical gradient depends on vegetation. Level above cold layer suitable for orchards. *Subject Headings:* **Microclimatology, Germany.**—*C.E.P.B.*

BIOCLIMATOLOGY

7–114 551.586:616

Lippert, Eugen, **Über die Möglichkeiten eines bioklimatischen Beitrages zur Kenntnis funktioneller und psychopathischer Zustandsbilder.** [On the possibilities of a bioclimatic contribution to knowledge of functional and psychopathic diagnoses.] *Wetter und Leben*, 2(9–10):198–202, March **1950. DWB**—Sensibility to weather is often psychological. Various types of disturbance of organic equilibrium are discussed in general terms. Possible factors: ionization, cooling power, solar activity, radiation, magnetic character, composition of air. Conclusions rather indefinite; exact experiment needed. *Subject Heading:* **Medical meteorology.**—*C.E.P.B.*

7–115 551.586:616

Bullrich, Kurt, **Vegetatives Nervensystem und Wetter am Beispiel des Asthmas.** [Vegetative nervous system and weather as exemplified by asthma.] *Meteorologische Rundschau*, 3(1–2):30–32, Jan.–Feb. **1950. DWB**—There are two types of asthma, one irritable following bronchitis etc., the other spastic. The whole effect of weather on man is through the vegetative nervous system, which has two main branches, the sympathetic and the vagus. All weather phenomena which resemble warm fronts bring on first type of asthma, those resembling cold fronts bring on second type. An experiment was made on a sufferer from both types by making

injections to deaden the sympathetic nerve. The bronchitic type was relieved but not the spastic type. *Subject Heading:* **Medical meteorology.**—*C.E.P.B.*

7–116 551.586:616

Reuter, Heinz, **Zur Hyperthermie der menschlichen Haut.** [On hyperthermy in human skin.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. B*, 1(1):9–16, **1948.** fig., 3 tables, 4 refs., 3 equations. Summary in German, English and French p. 9–10. **MH-BH**—Author calculates time required for skin temperature to rise from 33–41°C. under various conditions of insolation and relative humidity; 41°C. is the critical temperature for half the cases of lethal apoplexy. Up to an insolation of 1.0 cal/cm²/min. there is no danger of rapid hyperthermy but at 1.5 cal. it ensues in 15–30 minutes. *Subject Heading:* **Medical meteorology.**—*C.E.P.B.*

7–117 551.586.11

Bornschein, H., **Untersuchungen über die Hauttemperatur bei Sauerstoffmangel.** [Investigations of skin temperature lacking oxygen.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. B*, 1(3–4):422–430, **1949.** 2 figs., 2 tables, 19 refs. Summary in German, English and French p. 422–423. **DWB, MH-BH**—Tests on healthy subjects in air containing 11.2% oxygen (equivalent to a height of 4,500 meters) against controls in 21% oxygen at an operative temperature of 25°C. and R.H. 35% gave statistical results indicating that the temperature-regulating function of the skin is impaired by lack of oxygen. *Subject Heading:* **Medical meteorology.**—*C.E.P.B.*

7–118 551.586:631

Cordes, H., **Sommerliche Temperaturverhältnisse als agrarmeteorologisches Problem.** [Summer temperature conditions as a problem of agricultural meteorology.] *Meteorologische Rundschau*, 3(1–2):10–13, Jan.–Feb. **1950.** fig., 3 tables, 4 refs. **DWB**—Germany needs fat and albumen [protein] which can be provided by subtropical plants such as soya bean. These cannot survive winter so only one-year plants can be used and author investigates whether summer heat is sufficient to ripen fruits. He gives table and diagram of number of days with mean temperature 20°C.+ at Berlin 1766–1947—mean 32. Bologna (Mediterranean) has mean of 112. Germany is only on fringe of possibility. It cannot be assumed that climate is becoming more continental and possibility of a series of unfavorable years must be considered. *Subject Heading:* **Agricultural climatology.**—*C.E.P.B.*

7-119 551.586:63(497.2)

Gregor, Alois and Petrovič, Štefan, **O Buharské zemi.** [Bulgarian land.] *Meteorologické Zprávy*, 3(4–5):75–78, Feb. **1950.** 9 figs. **DWB**—At the invitation of the Bulgarian Meteorological Institute, the authors made a trip through Bulgaria in October 1949, and present in this article a number of photographs of hydrologic and agroclimatic works in that country. They noted the comparative aridity (less rainfall and higher summer temperatures) and the development of shelter belts in an attempt to ameliorate the climate. *Subject Headings:* **Agricultural climatology, Bulgaria.**—*M.R.*

7–120 551.586:63(477)

Nuttonson, M. Y., **The agricultural climatology, vegetative cover, and crop ecology of the Ukraine and the Ukrainian climatic analogues in North America.** Washington, D. C., U. S. Dept. of Agriculture, Office of Foreign Agricultural Relations, Jan. **1946.** 23 p. fig., 9 tables, bibliog. **DA**—Geography, climate and vegetation of the different belts of the Ukraine. Tables give the monthly mean temperature, average rainfall by months, extremes of frost and temperature, and climatic analogues for places in North America. *Subject Headings:* **Ecology, Agricultural climatology, Ukraine.**

7–121 551.586:634.8

Aichele, H., **Witterung und Weinertrag.** [Weather and wine yield.] *Wetter und Klima*, 2(5–6):167–173, May–June **1949.** fig. **DWB**—The favorable conditions at different seasons for quantity of grapes, weight of juice and total harvest are tabulated. *Subject Headings:* **Agricultural climatology, Viticulture.**

7–122 551.586:631:551.506.8

Schnelle, Fritz, **Phänologische Weltkarte: Beginn der Weizenernte, Verteilung der Weizenanbauflächen und der Weizenausfuhr.** [Phenological world chart: beginning of wheat harvest. Distribution of areas of cultivation of wheat crops and crop exports.] *Meteorologische Rundschau*, 2(3–4):65–66, March–April **1949.** 2 tables, chart, 7 refs. **MH-BH**—The dates of beginning of wheat harvests, and areas planted, are plotted on a world chart, with arrows showing the amount and destination of exports. *Subject Headings:* **Agricultural climatology, Phenology.**—*C.E.P.B.*

MISCELLANEOUS APPLICATIONS

ATMOSPHERIC OPTICS

7–123 551.591

Wengerd, Sherman A., **Visibility of signal cloth under tropical conditions.** *American Geophysical Union, Transactions*, 31, part 1, (2):165–168, April **1950.** 3 figs., table. **DWB, MH-BH**—Different colors of fresh and faded cloth with and without fluorescent dye were tested under various tropical weather conditions. Differences between observers often as great as between types of cloth. Yellows show up best on dark day and orange on a sunny day. Fluorescence is more important in extending visibility on cloudy than on sunny days. Results presented in histograms. *Subject Heading:* **Visibility.**—*M.R.*

7–124 551.593.11

*St. Amand, Pierre and Cronin, Harold, **Atmospheric refraction at College, Alaska, during the winter, 1947–1948.** *American Geophysical Union, Transactions*, 31, part 1, (2):161–164, April **1950.** 4 figs., 2 tables, 2 refs. **DWB, MH-BH**—Systematic observations were made at College (near Fairbanks), Alaska, to determine the corrections necessary for refraction tables when the solar angle is low. During the winter of 1947–1948 it was found that the apparent altitude varied from $+80''$ to $-4''$ for 1° to 12° elevation. Results presented in tabular and graphic form. Relation to temperature stratification not yet determined. Photograph shows mirage on mountain over 80 miles distant across Tanana Valley. *Subject Headings:* **Mirage, Atmospheric refraction, Alaska.**—*M.R.*

ATMOSPHERIC ELECTRICITY

7–125 551.594.11

Israël, Hans, **Zum Tagesgang des luftelektrischen Potentialgefälles.** [On diurnal variation of the atmospheric electric potential gradients.] *Meteorologische Rundschau*, 1(7–8):200–204, Jan.–Feb. **1948.** 4 figs., table, 10 refs. Summary in German and English p. 204. **DLC**—The time of nocturnal minimum of potential gradient in the atmosphere is nearly constant (3–5 a.m.) throughout the year, but the morning and evening maxima change time with the seasons suggesting a relation between turbulent exchange and the diurnal variation of potential gradient. Diurnal and seasonal variations also exist between potential gradient and air mass type, or amount of atmospheric pollution. Results of analysis, based on data obtained at Potsdam, Kew, in Saxony (Wahnsdorf) and in the mountains (Davos) shown in numerous graphs. *Subject Headings:* **Potential gradient, Diurnal variations.**—*M.R.*

7–126 551.594.11:551.588.7(436)

Schilling, G. F. and Seper, H., **Über die Abhängigkeit des luftelektrischen Potentialgradienten von der Grosstadtlage in Wien.** [On the dependence of atmospheric electrical potential gradients on the (city) metropolitan location of Vienna.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A*, 2(2–3):334–341, **1950.** 3 figs., table, 10 refs. Summary in German, English and French p. 334. **DWB, MH-BH**—Effect of houses, buildings and traffic on potential gradient is shown by observations made along a radius from the edge of Vienna to the center of the city on Oct. 1, 1947. It is shown that the potential gradient increases and the electrical conductivity decreases proportionally as one goes toward the center of the city. This explains the high conductivity at the Zentralanstalt where continuous records are made, since the observatory is in a park area. *Subject Headings:* **Atmospheric electricity, Potential gradient, Artificial influences, Vienna, Austria.**—*M.R.*

7–127 551.594.21:551.574.1

*Workman, E. J. and Reynolds, S. E., **Electrical phenomena occurring during the freezing of dilute aqueous solutions and their possible relationship to the thunderstorm electricity.** *Physical Review*, 78(3):254–259, May **1950.** 2 figs., table, 5 refs. **DLC, DWB**—Laboratory experiments on the freezing of a large number (43) of different chemical solutions gave a wide variation in electrical effects, as shown in table. Freezing of NH_4OH produced a potential difference of −232 volts. Methods and apparatus described and illustrated. A discussion of electrical and molecular changes which explain such differences and of freezing processes during formation of rain and hail in thunderstorms, is followed by speculation as to effects of modifying thunderstorm charges by use of large amounts of ammonia, and to possible detection of chemicals in clouds. *Subject Headings:* **Thunderstorm electricity, Freezing nuclei, Cloud modification.**—*M.R.*

7–128 551.594.221

*Jose, P. D., **The infrared spectrum of lightning.** *Journal of Geophysical Research*, 55(1):39–41, March **1950.** fig., table, 6 refs. **DWB**—Spectral photographs made on special emulsion extend range of lightning spectrum toward the infrared (up to 8,800 λ). No evidence of other lines than those produced by O(I) and N(I.) *Subject Headings:* **Lightning spectra, Infrared radiation.**—*M.R.*

7–129 551.594.25:621.396.9

*Austin, Pauline M. and Bemis, Alan C., **A quantitative study of the "bright band" in radar precipitation echoes.** *Journal of Meteorology*, 7(2):145–151, April **1950.** 6 figs., 2 tables, 10 refs. **DWB, MH-BH**—Observations of bright bands in radar echoes from clouds or precipitation on 24 selected days are tabulated, showing height of band, height of freezing level and difference in height ΔZ, thickness of bright band and lapse rate. It is concluded that such bands are caused by reflection from coalescence and melting of snow flakes at a level just below the 0°C. isotherm, and not by the formation of drops in a colloidally unstable layer of ice water mixture, as the latter would occur in most cases above the 0°C. isotherm. *Subject Headings:* **Zero isotherm, Bright band echoes, Radar.**—*M.R.*

7–130 551.594.25:621.396.9

Meetham, A. R., **Bright band in radar echoes.** *Weather*, 5(4):143–144, April **1950.** **MH-BH**—*Subject Headings:* **Radar, Bright band echoes.**

AURORA

7–131 551.594.5:550.385(41)

Dixon, F. E., **The aurora of January 25 to 26, 1938, and associated magnetic storm.** London, H. M. Stationery Office, **1948.** 16 p. 7 figs. (*Great Britain, Meteorological Office. Geophysical Memoirs*, No. 81.) At head of title: MO. 499a. **DWB**—Descriptions by observers in Britain, estimates of height, reproductions of magnetograms showing magnetic storm, and calculations of overhead electric currents. *Subject Headings:* **Auroras, Magnetic storms, Great Britain.**

7–132 551.594.5

*Nicolet, M. and Dogniaux, R., **Nouvelles suggestions au sujet de l'interprétation du spectre des aurores.** [New suggestions on the subject of the interpretation of the spectrum of auroras.] *Journal of Geophysical Research*, 55(1):21–32, March **1950.** 12 figs., 5 tables, 3 refs. Abstract in English p. 21. **DWB**—A great deal of painstaking data on intensity and width of spectral bands of auroral radiations are presented in tables and analyzed to show evidence of N_2^+ bands as distorted by temperature effect, O_2^+ bands and possibly NO and other emission bands. Data from synthetic auroral spectra are compared with actual data obtained by Vegard. *Subject Heading:* **Auroral spectra.**—*M.R.*

7–133 551.594.5:551.510.534

Petrie, William, **Remarks on the excitation of hydrogen and helium in the upper atmosphere.** *Canadian Journal of Research 26A*, (6):359–365, Nov. **1948.** fig., table, 15 refs.

DWB—A number of hydrogen and helium lines have been identified as features of the auroral spectrum. The relative intensities of the helium lines indicate an excitation temperature of 4,600°K. and the intensities of the hydrogen lines an excitation temperature of 7,600°K. *Subject Headings:* **Auroral spectra, Upper atmosphere.**—*Author's abstract.*

7–134 551.594.5(06)

Seaton, S. L. and Malich, C. W., **Auroral research at College, Alaska, 1941–1944,** in *Researches of the Department of Terrestrial Magnetism. Washington, D. C.*, Vol. 12, Part II of *Carnegie Institution of Washington, Publication No. 175*, **1947.** p. 373–397. 2 figs., 2 tables. **DLC**—Description of buildings, personnel, instruments and methods, difficulties, calibrations, accuracy, discussion of data. All complete nighttime radio fade-outs occurring after midnight were accompanied by high intensity zenith aurora. Cameras and accessories illustrated. Tables giving zenith auroral intensities in equivalent photometer values, and corresponding values of upper-frequency limits of blanketing type sporadic E reflections, Oct., 1943–Mar., 1944 for 15 minute intervals. *Subject Headings:* **Observatories, Auroral intensities, Alaska.**—*M.R.*

ACOUSTICAL PHENOMENA

7–135 551.596.1

Haskell, Norman A., **Diffraction effects in the propagation of compressional waves in the atmosphere.** *U. S. Air Force Cambridge Research Laboratories, Geophysical Research Papers*, No. 3, March **1950.** 43 p. 13 figs., 2 tables, 9 refs., 10 equations. **MH-BH**—An attempt is made to solve the acoustic wave equation asymptotically, for the case where the velocity of propagation depends only on altitude and there is only one minimum value. This approximate solution is applied to the problem of estimating the temperature at 25 to 60 km. on the basis of time of travel for acoustic waves from large explosions to zones of abnormal audibility. The methods, with slight modification, can be equally well applied to problems of long distance, transmission of sound in the ocean, or to particular types of seismic waves. Emphasis is placed on diffraction effects on range and frequency, and useful tables and graphs are included. *Subject Headings:* **Acoustical phenomena, Audibility zones, Upper air temperatures.**—*M.R.*

PART II. SELECTIVE ANNOTATED BIBLIOGRAPHY ON CLIMATIC CHANGES

By: *Charles Ernest Pelham Brooks*

EXPLANATORY NOTE

This bibliography is divided into four sections in each of which the entries are arranged in chronological order.

Section I. **General, and theories of the cause of climatic change.**
Section II. **Climatic changes in geological time, including the Quaternary Ice Age.**
Section III. **Climatic changes in the Post-glacial and Historical Periods.**
Section IV. **Climatic changes shown by instrumental meteorological observations (roughly since A. D. 1700).**

The literature of climatic change is so vast that a complete bibliography, if such were possible would have to include tens of thousands of entries. The great majority of these either would have referred to local details of stratigraphy, or would have been of temporary interest only. A rigid selection has had to be made, and the entries given here are for the most part limited to:

1. First publications of new ideas or discoveries which have played an important part in the development of the subject.
2. Classical presentations of new ideas or theories, usually in book form, and standard collections of data.
3. A few works of considerable interest which from their publication in obscure journals are unlikely to be generally known.
4. Comparatively recent publications, a knowledge of which is essential to a study of the subject.

The inclusion of any reference is not be taken as a criterion of its scientific soundness. Some theories which are now known to be unsound have played a great part in the history of climatic change.

To assist readers, a list of the main geological divisions is given below:

Era	Formation	Approximate age (million years)
Quaternary	Recent	—
	Pleistocene	1
Tertiary (Cenozoic)	Pliocene	13
	Miocene	30
	Oligocene	60
	Eocene	80
Mesozoic	Cretaceous	110
	Jurassic	155
	Trias	190
Palaeozoic	Permian	210–240
	Carboniferous (Pennsyvalnian)	260–300
	Devonian	310–340
	Silurian	340
	Ordovician	400
	Cambrian	510
Proterozoic	Keweenawan	560
	Animikian	—
	Huronian	—

Sub-divisions of the Quaternary Period:

	Alps	U. S. A.	Approx. date B.C.
Glacial Periods	Gunz	Nebraskan (Jerseyan)	ca. 500,000
	Mindel	Kansan	ca. 400,000
	Riss	Illinoian	ca. 130,000
	Wurm	Wisconsin (incl. Iowan)	40,000–18,000
Late Glacial		Preboreal	7800–6800
		End of Ice Age in Sweden	6800
		Boreal	6800–5600
		Atlantic (Climatic Optimum)	5600–2500
		Subboreal	2500–500
		Subatlantic	500 B.C.—Present

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SECTION I. GENERAL AND THEORIES OF THE CAUSE OF CLIMATIC CHANGE (551.583 551.583.7)

G–1 551.583.3:525.3

Adhémar, Joseph, **Les révolutions de la mer. Déluges périodiques.** [Revolutions of the sea. Periodic deluges.] Paris, **1844.** 2nd ed. **1860.** 189 p. **DLC**—Glaciation with winter in aphelion at maximum eccentricity of earth's orbit. *Subject Headings:* **Climatic changes, Inundations.**

G–2 551.583:581.056

Forbes, Edward, **On the connection between the distribution of the existing fauna and flora of the British Isles with the geological changes which have affected their area especially during the epoch of the Northern Drift.** *Geological Survey of Great Britain and Museum of Economic Geology, Memoirs,* Vol. I, (III) p. 336–432, **1846. DLC**—A pioneer work. Flora of British Isles classified into groups according to locality of their origin, and related to climatic variations. The oldest group, Lusitanian, of south-western origin, dates from Miocene. *Subject Headings:* **Climatic changes, Great Britain.**

G–3 551.583.78:561.1

Heer, O., **Untersuchungen über das Klima und die Vegetationsverhältnisse des Tertiärlandes.** [Investigations on the climate and vegetation conditions of the Tertiary lands.] Winterthur, J. Wurster, **1860.** 168 p. **DLC**—French translation 1861. The first comprehensive analysis of the climatic equivalents of fossil plant assemblages, especially in high latitudes. The warmth of the Arctic Tertiary climate was somewhat exaggerated. From comparisons of floras of different regions author believed that a uniform tropical climate prevailed over the whole earth for long periods. *Subject Heading:* **Climatic changes.**

G–4 551.583:525.3

Croll, James, **On the physical cause of the change of climate during geological epochs.** *Philosophical Magazine*, Ser. 4, 28:121–137, **1864. DLC**—The first statement of Croll's well-known theory of the effect of changes of eccentricity of earth's orbit on changes of climate. *See item* G–6. *Subject Headings:* **Climatic changes, Polar migration.**

G–5 551.583.3:525.3

Drayson, Lt.-Col., **On the cause, date and duration of the last glacial epoch of geology, and the probable antiquity of man. 1873.** Skinner, T. C. **Equator and ecliptic.** A statement of the Drayson problem up-to-date. *Royal Engineers Journal*, 57:129–142, **1943.** fold. plate. **DLC**—Drayson believes that the pole traces a circle round a center 6° from its present position. This is considered to explain glacial and interglacial periods and to provide an absolute chronology. Not accepted by astronomers. *Subject Headings:* **Climatic changes, Glacial periods, Polar migration.**

G–6 551.583:525.3

Croll, James, **Climate and time in their geological relations. A theory of secular changes of the earth's climate.** London, Daldy, Isbister, **1875.** 577 p. 4th ed., **1897. DLC**—A classical work on the theory of geological climates. Chaps. 2 and 3 discuss effectiveness of ocean currents in distributing heat over the earth. Chap. 4 introduces effect of eccentricity of earth's orbit on climate, chiefly by secondary action on snow cover and ocean currents. With winter in aphelion enough snow accumulates to persist over the short hot perihelion summer, aided by fogs over the ice. Chaps. 5 to 14 deal with causes of ocean currents, favoring the wind theory. Chaps. 15 and 16 discuss warm interglacial periods and Chaps. 17 and 18 pre-Quaternary ice ages. Then ext chapters deal with the age of the earth and the effect of obliquity on sea level. Coal is regarded as an interglacial formation. The last few chapters refer to the Ice Age in Britain and the mechanics of glacier motion. *Subject Headings:* **Climatic changes, Glacial periods, Ocean currents.**

G–7 551.583.3:525.3

Murphy, J. J., **The glacial climate and the polar ice-cap.** *Geological Society, London, Quarterly Journal*, 32:400–406, **1876. DLC**—Referring to Croll's theory, points out that glaciation was more probable with summer in aphelion and winter in perihelion. *Subject Headings:* **Climatic changes, Glacial periods.**

G–8 551.583

Czerny, Franz von, **Die Veränderlichkeit des Klimas und ihre Ursachen.** [The variability of climate and its causes.] Vienna, Pest, Leipzig, **1881.** 99 p. **DLC**—Discusses variations in the position of the sun relative to the earth, sunspots, lunar influences, changes in elevation and land- and sea-distribution, and effects of human activities. *Subject Headings:* **Climatic changes, Solar influences, Lunar influences.**

G–9 551.583.3

Wright, G. F., **The Ice Age in North America and its bearing on the antiquity of man.** New York, D. Appleton, **1890.** New ed., **1905.** Append. A, p. 573–595, W. Upham.—Probable causes of glaciation, in which ice ages are attributed to epeirogenetic uplift. *Subject Headings:* **Climatic changes, Glacial periods, North America.**

G–10 551.583:523.72

Dubois, E., **Die Klimate der geologischen Vergangenheit und ihre Beziehungen zur Entwicklungsgeschichte der Sonne.** [The climates of the geological past and their relation to the evolution of the sun.] Leipzig **1893.** London, Swan Sonnenschein, **1895.** 167 p. **DLC**—The sun gradually changed from blue-white to yellow (in the Tertiary) and yellow-red at intervals in the Quaternary. The diminution of radiation caused glacial periods. Obsolete. *Subject Headings:* **Climatic changes, Solar influences, Paleoclimates, Quaternary climates.**

G–11 551.583.3:551.465:551.8

Hull, E., **Another possible cause of the glacial epoch.** *Geological Society, London, Quarterly Journal*, 53:107–109, **1897. DLC**—An abstract of a paper published later under same title in *Victoria Institute, London, Journal and Transactions*, 31:141–157, **1899. DLC**—Glaciation is attributed to the deflection of the Gulf Stream by an Antillean continent. This theory gained wide currency at the time. *Subject Headings:* **Climatic changes, Glacial periods, Gulf stream.**

G–12 551.583:551.510.41:551.465

Chamberlin, T. C., **An attempt to frame a working hypothesis of the cause of glacial periods on an atmospheric basis.** *Journal of Geology*, 7:545–584, 715–787, **1899. DLC**—Discusses in great

detail the probable variations in the quantity of carbon dioxide in the atmosphere during different geological periods, to which great climatic effects are attributed (warm climate with much CO_2, cold climate or glaciation with little CO_2). Auxiliary effects are also considered, including a reversal of the oceanic circulation. In warm periods great evaporation in low latitudes caused the saline surface water to sink to the bottom, where it travelled to high latitudes, retaining its heat, and coming to the surface to cause warm polar climates. *Subject Headings:* **Climatic changes, Glacial periods, Atmospheric composition, Ocean currents.**

G–13 551.583:551.465

Ekholm, Nils, **Om klimatets ändringar i geologisk och historisk tid samt deras orsaker.** *Ymer, Stockholm*, p. 353, **1899.** 4 figs., 7 tables, refs. **DLC**—On the variations of the climate of the geological and historical past and their causes. *Royal Meteorological Society, Quarterly Journal*, 27:1–61, **1901. DLC**—Attributes major geological changes of climate to variations of CO_2 under constant solar radiation. Minor changes were due to astronomical causes, especially variations of obliquity of ecliptic. A present change from continental towards oceanic climate is recognized but the cause is unknown. *Subject Headings:* **Climatic changes, Solar influences, Atmospheric composition.**

G–14 551.583.3:551.513

Harmer, Frederic William, **The influence of the winds upon climate during the Pleistocene epoch: a palaeometeorological explanation of some geological problems.** *Geological Society, London, Quarterly Journal*, 57:405–478, **1901. Further remarks on the meteorological conditions of the Pleistocene epoch.** *Royal Meteorological Society, Quarterly Journal*, 51:247–259, **1925. DLC**—The first paper discusses the meteorology of the glacial periods on the assumption that glaciations in Europe alternated with those in North America; this is of historical interest only. The second paper, published posthumously, discusses the meteorological consequences of the closing of the North Atlantic gap by the elevation of the Wyville-Thomson ridge and suggests that this would first result in the glaciation of Scandinavia and a polar anticyclone. This would cause depressions to pass south of Britain and result in the extension of glaciation to the British Isles. *Subject Headings:* **Climatic changes, Glacial periods, Atmospheric circulation.**

G–15 551.583:525.3

Kreichgauer, D., **Die Aequatorfrage in der Geologie.** [The equator question in geology.] Steyl, Missionsdruckerei, **1902.** 394 p. refs. **DLC**—Climatic changes are attributed to a progressive movement of the present North Pole from the Southern Pacific (Pre-Cambrian) through the Pacific to a position between Hawaii and Mexico (Carboniferous), south of Alaska (Cretaceous), western Alaska (Tertiary) and across the Arctic Islands of Canada to Greenland (Quaternary) and thence up the east coast of Greenland to its present position. *Subject Headings:* **Climatic changes, Polar migration.**

G–16 551.583:550.36

Manson, Marsden, **The evolution of climates.** Rev. from the *American Geologist*, 1899. Baltimore, Lord Baltimore Press, **1922.** 66 p. **DLC**—Of historical interest. In early geological periods the earth, almost shut off from solar radiation by a mantle of cloud, was warmed by liberation of radio-active heat. Cloud sheet dissipated first over land in low latitudes, causing Permian glaciation. Pleistocene glaciation occurred in regions of maximum snowfall when liberation of earth-heat ceased. Continued decrease of cloudiness allowed sun to warm earth and melt ice. *Subject Headings:* **Climatic changes, Glacial periods.**

G–17 551.583

Gregory, John W., **Climatic variations, their extent and causes.** (Rep. from *Smithsonian Institution, Annual Report*, 1908, Washington, D. C., p. 339–354, **1909.**) **DLC**—Minimizes extent of past climatic changes. Points out objections to existing theories and favors changes of atmospheric circulation resulting from changes in land and sea distribution. *Subject Headings:* **Climatic changes, Atmospheric circulation.**

G–18 551.583:525.3

Spitaler, R., **Die jährlichen und periodischen Änderungen der Wärmeverteilung auf der Erdoberfläche und die Eiszeiten.** [The annual and periodic changes in the distribution of heat on earth's surface and ice ages.] *Beiträge zur Geophysik*, 8:565–602, **1907. DLC—Das Klima des Eiszeitalters.**]The climate of the Ice Age.] Prague, **1921. DLC**—Recalculates effect of changes of radiation on temperature by an analysis of present mean temperatures and amount of land in different latitudes. Adopts the view that a long cool summer favors glaciation. Overcomes difficulty of alternate glaciation in opposite hemispheres by the conserving effect of the oceans. Time-scale greatly exaggerated. *See item* G–49. *Subject Headings:* **Climatic changes, Glacial periods.**

G–19 551.583:55.04

Barrell, Joseph, **Relations between climate and terrestrial deposits.** *Journal of Geology*, 16:159–190, 255–295, 363–384, **1908.** **DLC**—Describes relation between the color of deposits and the temperature in which they were formed, owing to amount of organic material, oxidation of iron, etc. Coarseness of fluviatile deposits is related to aridity and snowfall. A valuable work of reference. *Subject Heading:* **Climatic changes.**

G–20 551.583.3:551.43

Ramsay, M., **Orogenesis und Klima.** [Mountain building and climate.] *Finska Vetenskaps Societetens Förhandlingar, Ofversigt*, Helsingfors, 52:1–48, **1909–10.** **The probable solution of the climate problem in geology.** *Geological Magazine*, London, 60:152, **1924.** **DLC**—*Smithsonian Report*, Washington, D. C., p. 237–248, **1924.** **DLC**—Great ice ages occurred immediately after great periods of mountain building owing to increased loss of heat from high ground, decrease of temperature with height and cooling by ice. Glacial oscillations due to isostatic lag. *Subject Headings:* **Climatic changes, Glacial periods.**

G–21 551.583:551.311.3:016

†Stuntz, S. C. and Free, E. E., **Bibliography of eolian geology.** *U. S. Dept. of Agriculture, Bureau of Soils, Bulletin*, 68:174–263, **1911.** **DA**—*Subject Headings:* **Loess, Bibliographies.**

G–22 551.583.3:551.510.42:551.21

Humphreys, W. J., **Volcanic dust and other factors in the production of climatic changes, and their possible relation to ice ages.** *Mount Wilson Observatory, Bulletin*, 6:1–34, **1913.** **DWB**—A volcanic dust veil such as that of Krakatoa takes 1–3 years to settle. The average diameter of dust particles is 0.85 microns; they scatter and reflect solar radiation but scarcely affect long-wave radiation. Hence a volcanic eruption lowers mean temperature by up to 10°F. for a year, and during past 160 years volcanoes have lowered long-period mean temperature by about 1°F. Volcanic dust may be an important contributory cause of ice ages. *Subject Headings:* **Climatic changes, Volcanic dust.**

G–23 551.583:523.74

Huntington, Ellsworth, **Solar hypothesis of climatic changes.** *Geological Society of America, Bulletin*, 25:477–590, **1915.** **DLC**—Huntington, Ellsworth and Visser, Stephen Sargent, **Climatic changes, their nature and causes.** New Haven, Yale Press, **1922.** 340 p. **DLC**—Climatic variations are attributed to changes in sunspot numbers. High spot numbers are accompanied by great storminess and loss of heat, and displacement of storm-tracks towards equator. In Permian tracks displaced almost to equator; higher latitudes desert. Solar variations attributed to "electromagnetic" effects on sun. *Subject Headings:* **Climatic changes, Solar influences.**

G–24 551.583:551.8

Wegener, Alfred, **Die Entstehung der Kontinente und Ozeane.** [The origin of continents and oceans.] Sammlung Vieweg, H.23, Braunschweig, 1915; 2 Aufl. Band 66, **1920.** 135 p. Transl. by J. G. A. Skerl, London, **1924.** **DLC**—Sets out the basis of the author's well-known theory of continental drift and movements of the poles, and discusses climatic evidence briefly. *See item* G-28. *Subject Headings:* **Climatic changes, Continental drift, Polar migration.**

G–25 551.583:551.8

†Arldt, Theodor, **Handbuch der Palaeogeographie.** [Handbook of palaeogeography.] Leipzig, Gebr. Borntraeger. Vol. I. Palaeaktologie, p. 1–679, **1919.** **DLC**—Vol. II. Palaeogeographie, p. 680–1647, **1922.** **DLC**—Very thorough treatment. Mainly concerned with methods and results of geographical reconstruction, but part V, p. 863–993, deals with palaeoclimatology; (A) Palaeothermology and palaeombrology [variations of temperature and rainfall]. Methods, geological, biological, geographical. (B) Glacial periods, Pre-Carboniferous, Permocarboniferous, Quaternary; pluvial periods; arid periods; climatic zones; summary. Palaeanemology [fossil winds]. Aitiologic palaeoclimatology—cosmic and terrestrial causes. Very well documented. *Subject Headings:* **Climatic changes, Paleoclimates, Glacial periods.**

G–26 551.583.3:525.3

Milankovitch, M., **Theorie mathématique des phénomènes thermiques produits par la radiation solaire.** [Mathematical theory of thermal phenomena produced by solar radiation.] Paris, Gauthier Villars, **1920.** 338 p. **DLC—Mathematische Klimalehre und astronomische Theorie der Klimaschwankungen.** [Mathematical climatology and astronomical theory of climate oscillations.] Köppen, W. and Geiger, R., *Handbuch der Klimatologie*, Vol. I, part A. Berlin, Gebr. Borntraeger, **1930.** 176 p. **DWB, DLC**—The basis of a great deal of later work on astronomical

causes of climatic variation. Part 1 deals with the distribution of solar radiation over the earth without taking account of the effect of the atmosphere. Part 2 discusses the influence of the atmosphere on radiation reaching the earth and the connection between incoming radiation and temperature (the "mathematical climate"). The third section consists of the astronomical theory of climatic oscillations. This begins with a historical introduction, followed by the numerical calculation of the secular changes of the astronomical elements (set out in tables); these are converted to variations of temperature and connected with the series of oscillations of the glaciers. *Subject Headings:* **Climatic changes, Solar influences.**

G–27 551.583

Brooks, C. E. P., **The evolution of climate.** London, Benn, 1922. 173 p. 2nd ed., **1925. DWB**—Mainly a description of the climatic changes of the Glacial, Post-glacial and historical periods, in Northern and Central Europe, Mediterranean, Asia, North America, Central and South America, Africa, Australia and New Zealand, Antarctic. Attempts dating and correlation of different series. *Subject Headings:* **Climatic changes, Glacial periods, Historical climates.**

G–28 551.583:551.8:525.3

Köppen, Wladimir and Wegener, Alfred, **Die Klimate der geologischen Vorzeit.** [The climates of the geological past.] Berlin, Gebr. Borntraeger, **1924.** 255 p. plate. **DWB**—Authors reconstruct relative positions of continents to each other and poles, assuming a zonal distribution of climate similar to the present, in various geological periods from Devonian to Quaternary, using glacial deposits, coal beds, desert deposits and remains of plants and animals. Late Palaeozoic glaciation is attributed to aggregation of South America, Africa, India and Australia round the South Pole. In Quaternary the pole wandered from Alaska in Miocene [!] through the Arctic Archipelago to Greenland (Mindel to Wurm) and so to present position. Glacials and interglacials are attributed to changes of eccentricity etc. *Subject Headings:* **Climatic changes, Paleoclimates, Quaternary climates, Polar migration, Solar influences.**

G–29 551.583.3:551.511

Paschinger, Victor, **Die Eiszeit ein meteorologischer Zyklus.** [The Ice Age a meteorological cycle.] *Zeitschrift für Gletscherkunde*, 13:29–65, **1924. DLC**—Glaciation due to fall of summer temperature bringing snow-line down to zone of maximum snowfall. As seas were cooled by ice, level of maximum snowfall fell below snow-line and glaciers retreated (interglacial). Oceans warmed again and level of maximum snowfall rose, bringing another glacial stage. Cycle repeated until the mountains are sufficiently lowered by erosion to bring it to an end (this stage is probably not yet reached). *Subject Headings:* **Climatic changes, Glacial periods.**

G–30 551.583:551.311.181

Brooks, C. E. P., **The problem of warm polar climates.** *Royal Meteorological Society, Quarterly Journal*, 51:83–94, **1925. DLC**—Sets out theory of natural instability of an ice cap and argues that a comparatively small access of heat to the Arctic Ocean would suffice to clear away the ice and raise temperature by about 25°C. Only two types of oceanic polar climate are possible, glacial and mild, and these have alternated throughout glacial time. *Subject Headings:* **Climatic changes, Glacial periods, Arctic Ocean.**

G–31 551.583.3:551.511(99)

Meinardus, W., **Über den Wasserhaushalt der Antarktis.** [On the water economy of the Antarctic.] *Gesellschaft der Wissenschaften zu Göttingen, Nachrichten*, p. 184–192, **1925**; ibid., p. 137–172, **1928. DLC**—Part I deals with present conditions and calculates that the existing ice-sheet would take about 15,000 years to form—the assumed mean depth of 1 km. ice is an over-estimate. Hence the ice-sheet is partly a survival from the Ice Age. Part II deals with water economy in the Ice Age and concludes that the ice-sheet could only have been formed in higher temperatures and stronger atmospheric circulation than the present. This applies only to the Antarctic. *Subject Headings:* **Climatic changes, Quaternary climates, Glaciation, Antarctic.**

G–32 551.583(02)

Brooks, C. E. P., **Climate through the ages; a study of the climatic factors and their variations.** London, Benn, 1926. 439 p. Rev. ed. London, Benn, New York and Toronto McGraw-Hill, **1949.** 395 p. **DLC**—Part I describes the climatic factors and their variations in geological time, including solar radiation and astronomical factors. The difference between "glacial" and "non-glacial" periods is emphasized. Part II, Geological climates and their causes, shows that the geographical theory of climatic change is quantitatively sufficient to explain the major oscillations; examines the continental drift theory and the objections to it; describes a geographical theory of the Late Palaeozoic

glaciation; and discusses various aspects of Quaternary climate. Part III, climates of the historical past, collects and analyzes a great deal of evidence about climatic changes since 5,000 B.C. and discusses possible causes. An appendix classifies theories of climatic change. *Subject Headings:* **Climatic changes, Paleoclimates, Historical climates.**

G–33 551.583:551.311.13/6

Coleman, A. P., **Ice ages, recent and ancient.** New York and London, Macmillan, **1926.** 296 p. **DLC**—Following an introduction on glaciers and their effects, Part I deals with the Pleistocene Ice Age in all parts of the world with special emphasis on North America. Part II, Pre-pleistocene Ice Ages, sets out the doubtful evidence of glaciation in Eocene and Mesozoic and then deals extensively with the Late Palaeozoic (Permo-Carboniferous) glaciation, briefly with supposed glaciations in Devonian, Silurian and Ordovician, and again more fully with early Cambrian or late Pre-Cambrian and Huronian glaciations. Part III sets out briefly various theories of the cause of ice ages and concludes that no single cause suffices. *Subject Headings:* **Climatic changes, Paleoclimates, Quaternary climates.**

G–34 551.583.3:551.515.7

Hobbs, William Herbert, **The glacial anticyclones; the poles of the atmospheric circulation.** New York, Macmillan, **1926.** 198 p. **DLC**—Describes gradual growth of knowledge of circulation over Greenland and Antarctic. Sets out theory of glacial anticyclones due to cold air and author's theory of nourishment of ice-sheets. The marked zonal climates of Quaternary and Present are attributed to part played by glacial anticyclones in general circulation; their absence explains the nearly uniform climate of most of geological time. The theory of glacial anticyclones was also set out in: W. H. Hobbs, **Characteristics of existing glaciers.** New York, **1911.** 301 p. **DLC**—*Subject Headings:* **Climatic changes, Glacial anticyclone theory, Atmospheric circulation.**

G–35 551.583.3:525.3

Hopfner, F., **Mathematische Grundlagen zu einer astronomischen Theorie der Klimaschwankungen.** [Mathematical basis for an astronomical theory of climatic oscillations.] *Beiträge zur Geophysik*, 15:116–166, 251–284, 354–375, 385–395, **1926.** 16:15–53, 248–268, **1927.** 17:10–35, 171–179, 405–406, **1927.** 18:73–114, **1927. DLC**—A highly mathematical discussion of the calculation of the seasonal and diurnal distribution of radiation on the earth from values of the obliquity of the ecliptic and elements of the earth's orbit. The resulting equations are summarized in the last two chapters. The actual values of the astronomical elements in the Quaternary are not calculated. Not of immediate practical value. *Subject Headings:* **Climatic changes, Solar influences.**

G–36 551.583.7:551.8

Lasareff, P., **Sur une méthode permettant de démontrer la dépendance des courants océaniques des vents alizés et sur le rôle des courants océaniques dans le changement du climat aux époques géologiques.** [On a method of showing the dependence of oceanic currents on the trade winds and on the role of oceanic currents in changes of climate in geological epochs.] *Beiträge zur Geophysik*, 21:215–233, **1929. DLC**—Plaster models of continents (Northern Hemisphere) in different periods were placed in a circular plane basin filled with water and jets of air directed obliquely towards the equator to represent trade winds. This gave reconstructions of ocean currents and explained climatic changes. Five are reproduced. *Subject Headings:* **Climatic changes, Ocean currents, Trade winds.**

G–37 551.583(02)

Kerner-Marilaun, F., **Paläoklimatologie.** [Paleoclimatology.] Berlin, Gebr. Borntraeger, **1930.** 512 p. **DLC**—A detailed study. Book I sets out evidence of geological climates: plants, terrestrial deposits, soils. II describes briefly reconstruction of climate. III deals with causes: elevation, land- and sea-distribution, latitude, pole-wanderings, astronomical factors, solar radiation, sunspots, volcanoes. In IV author's own mathematical studies of land and sea climates are summarized. V considers estimation of former positions and heights of mountain ranges, land distribution and solar climate, and geological time reckoning. In VI the synthesis of these factors is discussed, a method of estimating solar climate set out, and theories of glaciation considered. Poorly documented. *Subject Headings:* **Climatic changes, Paleoclimates.**

G–38 551.583

Discussion on geological climates. *Royal Society of London, Proceedings*, B, 106:299–313, **1930. DLC**—Speakers: G. C. Simpson (solar radiation theory), A. C. Seward (fossil plants as climatic indicators), J. W. Gregory (extent of climatic changes), C. E. P. Brooks (geographical causes of late Palaeozoic climate), C. Tate Regan (evidence of animals), Hamshaw Thomas (anomalies in plant distribution). *Subject Headings:* **Climatic changes, Paleoclimates.**

G–39 551.583.3:523.72

Simpson, Sir George, **The climate during the Pleistocene period.** *Royal Society of Edinburgh. Proceedings*, 50:262–296, **1930. DLC—Past climates. The Alexander Pedler lecture, 1929.** *Manchester, Memoirs of Literary and Philosophical Society*, 74(30):1–34, **1929.**—Quaternary glaciation is attributed to a combination of increased solar radiation, continental drift and pole movements. Glaciations occurred with radiation somewhat higher than at present. Gunz-Mindel and Riss-Wurm interglacials came at maximum of radiation and were warm and rainy. Mindel-Riss interglacial came at radiation minimum, long, dry, and cool. *Subject Headings:* **Climatic changes, Glacial periods, Solar influences.**

G–40 551.583.7:551.8

Willis, Bailey, **Isthmian links.** *Geological Society of America, Bulletin*, 43:917–952, **1932. DLC**—Reconstructions of geography are tested by climatic evidence and a geographic-orographic theory of Permo-Carboniferous glaciation (a development of Brooks' theory) is worked out. A world chart of reconstructed climates and ocean currents in Permian is given (in which Alaska is shown as glaciated). The Atlantic, shut off from warm currents, was further cooled by pack ice from Antarctic (supposed glaciated); centers of glaciation were near warm seas. *Subject Headings:* **Climatic changes, Glaciation, Paleoclimates.**

G–41 551.583.7:56

Nopcsa, Baron Francis, **The influence of geological and climatological factors on the distribution of non-marine fossil reptiles and stegocephalia.** *Geological Society, London, Quarterly Journal* 90:76–140, **1934. DLC—"Observations on the climatology,"** p. 118–130, discuss climatic changes from Permian to Cretaceous and their effect on evolution of reptiles. Favors a tectonic-climatic cycle. *Subject Headings:* **Climatic changes, Paleoclimates.**

G–42 551.583.3:523.72

Simpson, Sir George, **World climate during the Quaternary period.** *Royal Meteorological Society, Quarterly Journal*, 60:425–471, **1934.** Discussion p. 471–478. **DLC**—Sets out consequences of a double oscillation of solar radiation, causing four glaciations. Greater southward extension of ice-sheets in Atlantic region due to discharge of Arctic ice into Atlantic. Gunz-Mindel and Riss-Wurm interglacials marked by warm fauna and great spreads of gravels. In tropics two pluvial periods correspond with Gunz-Mindel and Riss-Wurm. At maximum glaciation temperature 5–10°C. higher than now; sun a variable star with periodicity of 100,000 years. *Subject Headings:* **Climatic changes, Quaternary climates, Glaciation, Solar influences.**

G–43 551.583:523.72

Himpel, Kurt, **Die Klimate der geologischen Vorzeit.** [The climates of geological time.] *Astronomische Gesellschaft Urania, Veröffentlichungen*, Wiesbaden, No. 4, **1937. DLC**—After discussing other theories, postulates that the sun suffered Nova-outbreaks in Mid-Algonkian, Late Upper Carboniferous and Late Pliocene. Each outbreak was followed by a decrease of solar radiation and a glacial period. Subsequently abandoned by author, *see item* G–52. *Subject Headings:* **Climatic changes, Paleoclimates, Glaciation.**

G–44 551.183:551.510.41

Callendar, G. S., **The composition of the atmosphere through the ages.** *Meteorological Magazine London*, 74:33–39, **1939. DLC**—A re-discussion of the CO_2 theory. Permo-Carboniferous and Quaternary glaciations attributed to removal of CO_2 by great forests of Coal Measures and Tertiary. Present rise of temperature due to consumption of coal. *Subject Headings:* **Climatic changes, Paleoclimates, Quaternary climates, Glaciation, Carbon dioxide, Atmospheric composition.**

G–45 551.583:523.72

Hoyle, F. and Lyttleton, R. A., **The effect of interstellar matter on climatic variations.** *Cambridge Philosophical Society, Proceedings*, 35:405–415, **1939. DLC**—At intervals of about 100 million years the sun passes through clouds of interstellar matter. Particles near the track fall into the sun, their kinetic energy being converted into heat and causing increased solar radiation. A possible solar basis of Simpson's theory. *Subject Headings:* **Climatic changes, Solar influences.**

G–46 551.583

Simpson, Sir George, **Possible causes of change in climate and their limitations.** *Linnaean Society of London, Proceedings*, Part 2, 152:190–219, **1939–40. DLC**—Discusses temperatures of Northern and Southern Hemispheres and considers that the small differences in spite of great differences in amount of land and sea rule out geographical theory. Astronomical theory analyzed and Milankovitch's calculations of resulting temperature changes regarded as exaggerated. A change in

solar radiation can change climate but it is not yet clear whether glacial periods were caused by an increase or decrease of solar radiation. [A modification of his earlier theory.] *Subject Headings:* **Climatic changes, Glacialperiods, Solar influences**

G–47 551.583 735.9:52

Ives, Ronald L., **An astronomical hypothesis to explain Permian glaciation.** *Franklin Institute, Journal*, 230:45–74, **1940. A corollary to the ring hypothesis,** ibid, 232:357–363, **1941. DLC**—Suggests that a small satellite near the earth was disrupted to form a ring round equator like Saturn's, causing storms and heavy snowfall along the boundary of the shadow. *Subject Headings:* **Climatic changes, Paleoclimates.**

G–48 551.583(02)

Wagner, A., **Klimaänderungen und Klimaschwankungen.** [Changes and oscillations of climate.] *Wissenschaft*, Braunschweig, Vol. 92, **1940. DLC**—A comprehensive work. Rise of winter temperature and decrease of annual range since 1800 attributed to strengthening of atmospheric circulation, due either to increased solar radiation or decreased volcanic dust. Variations of glaciers since 15th Century discussed, also changes in lake and river levels, severity of winters, etc. Post-glacial pollen sequences and development of stages of Baltic summarized. Finally author proposes a new theory of ice ages involving accumulation and dissipation of earth-heat due to radioactivity and mountain building in cycle of about 300 million years, with minor variations causing glacial and interglacial periods. *Subject Headings:* **Climatic changes, Glacial periods.**

G–49 551.583.3:525.3

Milankovitch, M., **Kanon der Erdbestrahlung und seine Anwendung auf das Eiszeitenproblem.** [Canon of radiation on earth and its application to the ice age problem.] Académie Royale Serbe, Belgrade, edition spéciales, 132, **1941.** 633 p. **DLC**—Contains all relevant data for theory of astronomical changes of climate. *See also:* Spitaler, R., **Die Bestrahlungskurve in der Eiszeit nach Milankovitch und Spitaler.** [The radiation curve of the Ice Age after Milankovitch and Spitaler.] *Deutsche Akademie der Wissenschaft, Prague, (math.-nat. Kl.), Abhandlungen*, 13, **1943.** 18 p.—General agreement shown to have been reached between their respective calculations, except in the amplitudes of some maxima and minima. *Subject Headings:* **Climatic changes, Solar influences.**

G–50 551.583.3:551.511

Lewis, Gilbert N., **Thermodynamics of an ice age; the cause and sequence of glaciation.** *Science*, 104:43–47, **1946. DLC**—Develops a theory that an ice-sheet owing to its low surface temperature once started (by temporary increase of snowfall) grows by attracting moisture ("siphoning process"). Pluvial periods precede glacial, followed by a cool dry climate. *Subject Headings:* **Climatic changes, Glaciation.**

G–51 551.583.2:551.586:551.588

†Berg, Leo S., **Klimat i zhizn'.** [Climate and life.] 2nd rev. and enl. ed. OGIZ, Moscow, **1947.** 356 p. figs., tables, refs. Author and subject index. **DLC**—Recent changes in climate: warming in Arctic, recession of border of permafrost, warming in middle latitudes, in mountains, in Gulf Stream, decrease in continentality. Changes in historical times: moisture in atmosphere and soil, shrinking of lakes, decrease in river run-off, changes in vegetative cover, soil changes, deserts; changes in central Asia and Siberia and abroad; in the level of the Caspian and in navigation conditions in Arctic. Desiccation in latest epoch. Changes in relief accompanying drying out of last era. Changes in biological distribution in sub-Arctic regions. Changes in sea-life in Northern Hemisphere. Bipolar distribution of organisms in connection with glacial period. Loess as a product of increase in wind and soil formation processes. Climate of geological eras. Life and soil changes in heart of continent: pioneer life and paleontological data on ancient life. Completely annotated with index of Latin names of plant and animal species and authors referred to in text; extensive bibliographies at end of each chapter, and index of subjects and geographical names. Chapter on loess is very comprehensive. *Subject Headings:* **Paleoclimates, Climatic variations, Bioclimatology, Loess.**—*M.R.*

G–52 551.583:523.72

Himpel, Kurt, **Ein Beitrag zum Eiszeitproblem.** [A contribution to the Ice Age problem.] Sternwarte des physikalischen Vereins, Frankfurt, No. 1. (Reprinted from *Zeitschrift für Naturforschung*, 2a:419–427, **1947.**) **DGS**—Ice ages attributed to sun passing through a cloud of dark cosmic matter. Glacial and interglacial stages due to different densities of cloud; we are now in a thin part. *Subject Headings:* **Climatic changes, Glacial periods.**

G–53 551.583:551.311.12

Stockholm, Svenska Sällskapet för Antropologi och Geografi, **Glaciers and climate**; geophysical and geomorphological essays dedicated to Hans W:son Ahlmann 14 November 1949. *Geografiska Annaler*, 1–2; **1949.** 383 p. **DWB**—Includes 33 contributions. Of climatic interest are: C. E. P. Brooks, Post-glacial climatic changes in the light of recent glaciological research (variations of circulation); J. Eythorsson, Temperature variations in Iceland; B. Helland-Hansen, Remarks on some variations in atmosphere and sea; H. Landsberg, Climatic trends in the series of temperature observations at New Haven, Connecticut; J. Leighley, On continentality and glaciation (types of circulation in Canada favorable to snowfall); G. H. Liljequist, On fluctuations of the summer mean temperature in Sweden; E. Nilsson, The pluvials of East Africa; S. Petterssen, Changes in the general circulation associated with the recent climatic variation; C. C. Wallen, The shrinkage of the Kårsa Glacier and its probable meteorological causes; H. C. Willett, Solar variability as a factor in the fluctuations of climate during geological time; A. Ångström, Atmospheric circulation, climatic variations and continentality of climate. *Subject Headings:* **Climatic changes, Glaciation.**

G–54 551.583:551.513

Willett, H. C., **Long-period fluctuations of the general circulation of the atmosphere.** *Journal of Meteorology*, 6:34–50, **1949. DWB**—Pt. I discusses cyclic and secular variations of climate in historical period and their relations to the general circulation of the atmosphere. Pt. II deals with theories of geological climate and favors variations of solar radiation mostly in ultraviolet. In Pt. III post-glacial variations are interpreted as contractions or expansions of the circumpolar zonal circulation, due to sunspots. *Subject Headings:* **Climatic changes, Historical climates, Solar influences.**

SECTION II. CLIMATIC CHANGES IN GEOLOGICAL TIME, INCLUDING THE QUATERNARY ICE AGE (551.583.3 551.583.7)

G–55 551.583.7:56

Hooke, Robert, **Posthumous works.** London, **1705. DLC**—*Inter alia*, infers a former tropical marine climate of England from fossil ammonites and turtles, which he attributes to changes in the earth's axis of rotation and shift of center of gravity. Noah's flood attributed to land and sea movements. *Subject Headings:* **Climatic changes, England.**

G–56 551.583.3

Playfair, John, **Illustrations of the Huttonian theory of the earth. 1802.** 528 p. **DLC**—Recognized an erratic block near Neuenberg as transported by a former glacier, but did not follow up the idea. This is probably the first reference to a former extension of glaciers. *Subject Headings:* **Climatic changes, Glaciers.**

G–57 551.583.3(234.3)

Venetz, M. J., **Mémoire sur les variations de la température dans les Alpes de la Suisse.** [Memoir on the variations of temperature in the Swiss Alps.] *Schweizerische Gesellschaft für Naturwissenschaft, Denkschrift*, 1, Pt. 2:1–38, **1833. DLC**—Written in 1821, inferred from traces of former extension of glaciers of Canton du Valais that climate was formerly much more severe. *Subject Headings:* **Climatic changes, Quaternary climates, Alps.**

G–58 551.583.3(234.3)

Agassiz, L., **Études sur les glaciers.** Solothurn, **1840. Untersuchungen über die Gletscher.** [Studies of glaciers.] 2 vols. Neuchatel, **1840–41. DLC**—First firmly established the former much greater extension of Alpine glaciers. *Subject Headings:* **Climatic changes, Glaciers, Alps.**

G–59 551.583.736:551.311.15

Ramsay, A. C., **On the occurrence of angular, subangular, polished and striated fragments and boulders in the Permian breccia of Shropshire, Worcestershire, etc. and on the probable existence of glaciers and icebergs in the Permian epoch.** *Geological Society, London, Quarterly Journal*, 11:185–205, **1855. DLC**—Ramsay was the first to attribute a glacial origin to consolidated pre-Pleistocene deposits. They raised great interest at the time but are not now generally accepted as glacial. *Subject Headings:* **Climatic changes, Paleoclimates, Glaciation, England.**

G–60 551.583.762:551.581

Marcou, J., **Lettres sur les roches du Jura et leur distribution géographique dans les deux hemisphères.** [Letters on the Jurassic rocks and their geographical distribution in the two hemi-

spheres.] Paris, **1857–60.** **DGS**—Constructed a geographical world chart of Jurassic, showing eight climatic provinces, partly zonal. A remarkable pioneer work. *Subject Headings:* **Climatic changes, Paleoclimates, Climatic zones.**

G–61 551.583.3(43)

Stark, F., **Die bayerischen Seen und die alten Moränen.** [The Bavarian lakes and the old moraines.] *Zeitschrift des Deutschen und Österreichischen Alpenvereins,* 4:67–78, **1873.** chart.—The first map of the extent of the Pleistocene glaciation of the Alps. *Subject Headings:* **Climatic changes, Quaternary climates, Lakes, Glaciation, Alps.**

G–62 551.583.3(02)

Geikie, James, **The Great Ice Age and its relation to the antiquity of man.** London, **1874.** 3rd ed., London, E. Stanford, **1894.** 850 p. **DLC**—A general survey of the facts of the Pleistocene glaciation, in which he recognized the Ice Age as an epoch of especially marked climatic oscillations. The sequence in Scotland is classified as: Glacial; Saxonian (Lowest boulder clay); Helvetian (Interglacial); Polandian (Upper boulder clay); Neudeckian (Interglacial); Mecklenburgian (Valley glaciers and district ice-sheets). Post-glacial: Lower Forestian (Forest growth on lowlands); Lower Turbarian (Local valley glaciers, 50 ft. beach, lower peat); Upper Forestian (Forest growth on peat bogs); Upper Turbarian (Corrie glaciers, renewed peat, 25 ft. beach—the last mentioned is now known to be older); Recent. Even in the first edition maps of glaciated areas in different regions are given. *Subject Headings:* **Climatic changes, Quaternary climates, Glaciation, Scotland.**

G–63 551.583.3:551.481

Gilbert, G. K., **Contributions to the history of Lake Bonneville.** *U. S. Geological Survey, Second Annual Report,* p. 167–200, **1880. Lake Bonneville.** *U. S. Geological Survey* 1, **1890.** (Monograph.) **DGS**—A double rise and fall of level of a large lake in the north-eastern part of the Great Basin, now represented by the Great Salt Lake, during Pleistocene is identified. *See item* G–67. *Subject Headings:* **Climatic changes, Quaternary climates, Lake Bonneville, Great Basin.**

G–64 551.583.3(234.3)

Penck, Albrecht, **Die Vergletscherung der deutschen Alpen, ihre Ursachen, periodische Wiederkehr und ihr Einfluss auf die Bodengestaltung.** [The glaciation of the German Alps, its causes, periodic recurrence and its influence of the configuration.] Leipzig, **1882.** 483 p. **DLC**—Contains the first world chart of the distribution of Pleistocene ice-sheets and glaciers. *Subject Headings:* **Climatic changes, Quaternary climates, Glaciation, Alps.**

G–65 551.583:551.577.3:551.481

Whitney, J. D., **The climatic changes of later geologic times.** *Harvard University, Museum of Comparative Zoology, Memoirs,* 7(2):1–394, **1882. DLC**—An exhaustive collection of the evidence for greater rainfall in former times. *Subject Heading:* **Climatic changes.**

G–66 551.583.762:551.581

Neumayr, M., **Über klimatische Zonen während der Jura- und Kreidezeit.** [On climatic zones during the Jurassic and Cretaceous.] *K. Akademie, Vienna, Math.-naturw. Klasse, Denkschrift,* 47:277–310, **1883. DLC**—The Northern Hemisphere is divided into three zones: boreal, central-European (temperate) and Mediterranean or Alpine (hot). A south temperate zone was added later. For the first time the geographic, climatic and stratigraphic data were synthesized. A very fruitful work. *Subject Headings:* **Climatic changes, Paleoclimates, Climatic zones.**

G–67 551.583.3:551.481

Russell, Israel C., **Geological history of Lake Lahontan, a Quaternary lake of north-western Nevada.** *U. S. Geological Survey, Monograph,* 11, Washington, D. C., U. S. Govt. Print. Off., **1885.** 288 p. **DLC**—Describes the double rise and fall of a large Quaternary lake in the north-west of the Great Basin, now represented only by a few small brackish lakes. *See item* G–63. *Subject Headings:* **Climatic changes, Quaternary climates, Lakes, Great Basin.**

G–68 551.583.3:551.311.2

Salisbury, R. D., **Distinct glacial epochs and the criteria for their recognition.** *Journal of Geology,* 1:61–84, **1893. DLC**—First recognized the importance of weathering as a measure of the lapse of time and indication of an interglacial period. *Subject Headings:* **Climatic changes, Glacial periods.**

G–69 551.583.3(234.3)

Penck, Albrecht and Brückner, Eduard, **Die Alpen im Eiszeitalter.** [The Alps in the Ice Age.] Leipzig, Tauchnitz, **1901–1909.** 3 Vols. 1199 p. **DLC**—This model survey forms a most comprehensive and detailed account of local moraines, fluvio-glacial gravels of river valleys, post-glacial transition and interglacial deposits. Different regions are correlated under names: Gunz, Mindel, Riss, Wurm, and post-glacial stadia Bühl, Gschnitz and Daun. A chronology is worked out, which is still widely used. *Subject Headings:* **Climatic changes, Glacial periods, Alps.**

G–70 551.583.3:551.311.2

Leverett, F., **Comparison of North American and European glacial deposits.** *Zeitschrift für Gletscherkunde,* 4:241–295, 321–342, **1910. DLC**—Author examined a great number of glacial deposits in North America and the most typical ones in Europe and concluded that the four glaciations in these two continents show such great resemblances both in amount of weathering and in the intervals between glaciations that the two series must be directly comparable. Gives correlation table Keewatin—Labrador—North Europe—Alps. *Subject Headings:* **Climatic changes, Glacial periods, North America, Europe.**

G–71 551.583.762:551.581

Uhlig, V., **Die marinen Reiche des Jura und der Unterkreide.** [The marine provinces of the Jurassic and Lower Cretaceous.] *Geologische Gesellschaft in Wien, Mitteilungen,* 4:329–448, **1911. DGS**—Distinguishes 5 faunal zones: Boreal, Mediterranean-Caucasian, Himalayan, Japanese and South Andean, but the last four are facies of a tropical zone contrasted with the cooler boreal. Boundary between these zones not strictly parallel with latitude, but shows divagations attributed to ocean currents. *Subject Headings:* **Climatic changes, Paleoclimates, Climatic zones.**

G–72 551.583.735.9:551.311.15

Sayles, Robert W., **The Squantum Tillite.** *Harvard University, Museum of Comparative Zoology, Bulletin* 56(2):141–173, **1914.** 11 photo plates. **DLC**—Description of glacial beds showing fluctuations of a continental or piedmont glacier near Boston, Mass. This gave final proof of glacial origin of these much disputed late Palaeozoic deposits. *Subject Headings:* **Climatic changes, Glacial periods, Massachusetts.**

G–73 551.583.3

Brooks, C. E. P., **The correlation of the Quaternary deposits of the British Isles with those of the continent of Europe.** *Smithsonian Institution, Annual Report,* Washington, D. C., p. 277–375, **1917. DLC**—An early attempt at a cross-correlation of glacial and interglacial deposits on the basis of synchronism of climatic changes over wide areas. Now obsolete. *Subject Headings:* **Climatic changes, Quaternary climates, Great Britain, Europe.**

G–74 551.583:551.311.2

Sayles, Robert W., **Seasonal deposition in aqueo-glacial sediments.** *Harvard University, Museum of Comparative Zoology, Memoirs,* 47(1):1–67, **1919.** 16 plates. **DLC**—A discussion of the origin of banding in glacial clays, especially those associated with the Squantum tillite near Boston, Mass. Includes a summary of literature. *Subject Headings:* **Climatic changes, Glacial periods, Massachusetts.**

G–75 551.583.3

†Osborn, Henry Fairfield and Reeds, Chester A., **Old and new standards of Pleistocene division in relation to the prehistory of man in Europe.** *Geological Society of America, Bulletin,* 33:411–490, **1922. DLC**—Part I summarizes glacial correlations of Geikie, Penck and Brückner, and Depéret, peri-Alpine time standards, Leveret's comparison of North America and Europe, Brooks' correlation of north Europe, Depéret's chronological division, and de Geer's post-glacial chronology. Part II gives correlation with human industries. Part III is a critical discussion by various authors. Bibliography of 68 items to 1921. *Subject Headings:* **Climatic changes, Quaternary climates, Europe, North America.**

G–76 551.583:551.311.3

†Högbom, I., **Ancient inland dunes of northern and middle Europe.** *Geografiska Annaler,* 5:113–243, **1923.** refs., p. 238–242. **DLC**—A standard work on fossil dunes. Part I summarizes the theory of dune formation. Part II describes ancient dunes of Fenno-Scandia and Denmark and Part III those of Germany, Poland, the Baltic States and Hungary. Part IV, gives author's conclusions as to climate. The dunes indicate strong northwesterly winds in middle and northern Sweden (high pressure over remains of ice-sheet, low pressure over eastern Europe). The probable

isobars and winds in finiglacial summer are reconstructed. In north Germany the winds were westerly; their age is uncertain but they are probably younger than the Scandinavian dunes. There is no connection with loess beds in Central Europe. *Subject Headings:* **Climatic changes, Europe.**

G–77 551.583.3(54)

Loewe, F., **Die Eiszeit in Kaschmir, Baltistan und Ladakh.** [The Ice Age in Kashmir, Baltistan and Ladakh.] *Gesellschaft für Erdkunde zu Berlin, Zeitschrift*, 18:42–53, **1924. DLC**—Recognizes four glaciations, in second of which snow-line descended below 3,500 m. Fourth represented only by isolated glaciers. *Subject Headings:* **Climatic changes, Glacial periods, India.**

G–78 551.583.3(4)

Kessler, Paul L., **Das eiszeitliche Klima und seine geologischen Wirkungen im nicht vereisten Gebiet.** [The glacial climate and its geological effects in the unglaciated region.] Stuttgart, E. Schweizerbart'sche Verlagsb., **1925.** 210 p. **DLC**—Climate between Scandinavian and Alpine ice very cold in winter, but with hot spells in summer. Mean annual temperature below −2°C. Great daily range. Cold dry winds off northern ice interrupted in spring by föhn. Upper winds westerly. *Subject Headings:* **Climatic changes, Glacial periods, Scandinavia.**

G–79 551.583.736:551.8

Schuchert, Ch., **The palaeogeography of Permian time in relation to the geography of earlier and later periods.** *Second Pan-Pacific Science Congress, Proceedings*, p. 1079–1091, **1926. DLC.** Also: **Review of the late Palaeozoic formations and faunas, with special reference to the ice-age of middle Permian time.** *Geological Society of America, Bulletin*, 39:769–886, **1928. DLC**—Attributes Permian ice age to youthful topography, enlarged continents and peculiar land connections. The latter shut in much of Antarctic Ocean and gave moist climates in Southern Hemisphere. *Subject Headings:* **Climatic changes, Paleoclimates.**

G–80 551.583.3(09)

†Thwaites, F. T., **The development of the theory of multiple glaciation in North America.** *Wisconsin Academy of Science, Transactions*, 23:41–164, **1927. DLC**—A historical summary of the views on the number of independent glaciations, position of Iowan, etc., with numerous references arranged regionally. *Subject Headings:* **Climatic changes, Glacial periods, North America.**

G–81 551.583.3

†Antevs, Ernst, **The last glaciation: with special reference to the ice retreat in north-eastern North America.** *American Geographical Society Research Series No. 17. Shaler Memorial Series, New York*, **1928.** 292 p. refs., 10 plates of varve measurements. **DLC**—The general part discusses whether glaciations in different parts of the world were sychronous (exact synchronism not yet proved), climatic conditions during growth and extension of ice-sheets, maximum stand, decline and disappearance (all parts of world considered); altitude and surface slope of ice-sheets; thickness, extent and volume; stand of sea level at climax (estimated as 290–303 feet below present). Then follows a detailed discussion of retreat of last ice-sheet in eastern North America and probable correlation with Europe. *Subject Headings:* **Climatic changes, Glacial periods, North America.**

G–82 551.583.78:523.74:525.3

Bradley, Wilmot H., **The varves and climate of the Green River epoch.** *U. S. Geological Survey, Professional Paper* 158-E, p. 85–110, **1929. DLC**—Deposits in lake beds of middle Eocene show a climate with cool moist winters and long warm summers. Annual layers (varves) show periodicities of 11–12 years (sunspot cycle), 50 years and 21,600 years (resultant of changes of eccentricity and precession of equinoxes). *Subject Headings:* **Climatic changes, Paleoclimates, Solar influences.**

G–83 551.583.756:561.1(98)

Berry, E. W., **The past climate of the North Polar region.** *Smithsonian Miscellaneous Collections*, 82, No. 6, Washington, D. C., **1930.** 29 p. **DLC**—Mesozoic floras surrounding North Pole, point to higher temperatures and less sharp zonation than at present but not to subtropical conditions and absence of zones. They prove conclusively that pole was in present position. *Subject Headings:* **Climatic changes, Paleoclimates, Arctic.**

G–84 551.583.3

British Association for Advancement of Science, **Discussion on the relation between past pluvial and glacial periods.** *Report, Bristol Meeting*, p. 371–386, **1930. DGS**—Opened by H. J. Fleure with a suggested correlation of glacial deposits and pluvial periods, Europe, East Africa and Jordan valley. Followed by: Leslie Armstrong, **Early man and the correlation of glacial deposits and pluvial**

periods; J. W. Gregory, **The correlation of pluvial periods and the German drifts**; P. G. H. Boswell, **Early man and the correlation of glacial deposits**; J. D. Solomon, H. J. E. Peake and G. C. Simpson (solar radiation theory), C. E. P. Brooks and E. J. Wayland (Pleistocene pluvials in Uganda) and others contributed. *Subject Headings:* **Climatic changes, Historical climates.**

G–85 551.583.3:551.481(676)

Leakey, L. S. B., **The stone age cultures of Kenya Colony.** Cambridge, University Press, **1931.** 283 p. **DLC**—"Climatic changes" p. 6–18 summarizes changes of level of Lake Nakuru as First and Second major pluvials, the second being double, and First and Second post-pluvial wet phases. Similar variations are described in Uganda and Tanganyika. Correlation with Europe discussed by C. E. P. Brooks, p. 267–270. *Subject Headings:* **Climatic changes, Lakes, Africa.**

G–86 551.583.3:551.481(676)

Nilsson, Eric, **Quaternary glaciations and pluvial lakes in British East Africa.** *Geografiska Annaler*, 13:249–348, **1931.** 4 plates. **DLC**—A detailed study of the ancient lakes, ancient glaciers and climatic epochs and sub-epochs. Very detailed correlation with Europe; Kamasia Lake = Mindel + Gunz; arid period is Mindel-Riss; Lakes I and II = Riss; arid period = Riss-Wurm; Lake IV is late-glacial; Lakes V–VII represent post-glacial oscillations. Variations of Lakes Yaya and Tana (Abyssinia) also discussed, and compared with Fayum lakes and Nile terraces. Considers that there is strong evidence that climatic changes were contemporaneous over whole area. *Subject Headings:* **Climatic changes, Quaternary climates, East Africa.**

G–87 551.583.3:551.311.3(729)

†Sayles, Robert W., **Bermuda during the Ice Age.** *American Academy of Arts and Sciences, Proceedings*, 66:381–467, **1931.** 12 photo plates, fold. table, biblio. **DLC**—Deposits show a succession of eolian limestones and fossil soils. Eolian type attributed to glacial stages when sea was low and wind strong from SW. Soils interglacial. The succession of eolianites and soils gives a series of climatic variations correlated with North American series from Nebraskan to end of Wisconsin. *Subject Headings:* **Climatic changes, Glacial periods, Bermuda.**

G–88 551.583.3(82)

Caldenius, Carl C:zon, **Las glaciaciones cuaternarias en la Patagonia y Tierra del Fuego. Una investigacion regional, estratigráfica y geocronológica. Una comparación con la escala geocronológica sueca.** [The quaternary glaciations in Patagonia and Tierra del Fuego. A regional, stratigraphical and geochronological investigation. A comparison with the Swedish time-scale.] *Geografiska Annaler*, 14:1–164, **1932.** 42 plates. **DLC**—A fourfold glaciation, mostly by valley glaciers, is dated by varves and considered to represent the four stages of Wurm, the last two representing Gotiglacial and Finiglacial of Scandinavia. *Subject Headings:* **Climatic changes, Quaternary climates, Argentina.**

G–89 551.583.3(516)

Ficker, H. von, **Die eiszeitliche Vergletscherung der nordwestlichen Pamirgebiete.** [The Ice-Age glaciation of the north-west Pamir region.] *Akademie der Wissenschaft, Berlin, Phys-math. Kl., Sitzungsberichte*, 2:61–86, **1933.** **DLC**—From the cross section of the Pleistocene Muksu Glacier the ice-transport was calculated. The glacier originated in an ice cap on the steppe; author calculates that at maximum glaciation precipitation was 1,000 mm. a year, 4 or 5 times present. The depression of the firn line was even greater than in Alps. There were later, post-glacial, advances. *Subject Headings:* **Climatic changes, Glacial periods, Asia.**

G–90 551.583.3:58(676)

Moreau, R. E., **Pleistocene climatic changes and the distribution of life in East Africa.** *Amani Memoirs, Journal of Ecology*, 21:415–435, **1933.** **DLC**—Succession: Kamasian pluvial, before 400,000 years ago, with temperate forest climate; dry interval; pluvial conditions and dominant montane forest re-established and maintained to 20,000 B.C. Severe dry period destroyed some forests, partly re-established before 10,000 B.C. under temperatures similar to present. Subsequent changes less important. *Subject Headings:* **Climatic changes, Quaternary climates, East Africa.**

G–91 551.583.78:561.1(42)

Reid, Eleanor Mary and Chandler, Marjorie Elizabeth Jane, **The London Clay flora.** London, British Museum (Natural History), **1933.** 561 p. 33 plates. **DLC**—The introduction (p. 63–28, 88–9) includes a detailed discussion of tropical Eocene climate of southeast England on the basis of the flora and geographical conditions. *Subject Headings:* **Climatic changes, Paleoclimates, England.**

G–92 551.583:551.311.12(988)

Wager, L. R., **The form and age of the Greenland ice cap.** *Geological Magazine, London,* 70:145–156, 1933. 12 plates. **DLC**—From topography author infers that Greenland was elevated as a plateau in Miocene and an ice-sheet began to form almost immediately. Gradual cooling of seas by ice was the precursor of general glaciation. *Subject Headings:* **Climatic changes, Paleoclimates, Greenland.**

G–93 551.583.3:529

de Geer, Gerard, **Geology and geochronology.** *Geografiska Annaler,* 16:1–52, **1934.** 2 plates. **DLC**—A history of dating ice-recession by annual layers of sediment (varves) and of development and testing of overseas connections, from the first measurements in 1905. Includes: Sweden-North America, Iceland-Sweden, Himalaya-Sweden, Alps-Sweden, South America-Sweden. Describes geochronologic subdivisions of Late Quaternary and answers criticisms. *Subject Headings:* **Climatic changes, Quaternary climates, Varves.**

G–94 551.583.3:551.481(676)

Wayland, E. J., **Rifts, rivers, rains and early man in Uganda.** *Royal Anthropological Institute, Journal,* 64:333–352, **1934.** 16 photos. **DLC**—Gives a reconstruction of rainfall in Uganda from Earliest-Kafuan [? = Gunz] to present, and correlation with cultures and Alpine sequence. Nothing catastrophic in either pluvials or arid periods. *Subject Headings:* **Climatic changes, Quaternary climates, Historical climates, Uganda.**

G–95 551.583.762:563.6

Arkell, W. J., **On the nature, origin and climatic significance of the coral reefs in the vicinity of Oxford.** *Geological Society, London, Quarterly Journal,* 41:77–110, **1935. DLC**—Considers that temperature of Jurassic seas around Oxford was very probably above 60°F. *Subject Headings:* **Climatic changes, Paleoclimates, Oxford.**

G–96 551.583.78:561.1

LaMotte, Robert Smith, **Contributions to palaeontology. II. Climatic implications of *Sapindus oregonianus*. V. The Upper Cedarville flora of northwestern Nevada and adjacent California.** *Carnegie Institution of Washington, Publication* No. 455:29–38, **1935**; 57–142, **1936.** plates. **DLC**—In Upper Miocene climate was temperate or warm temperate, like South Japan or Fukien, rainfall over 50 cm. By Lower Pliocene climate had become steppe-like, due to rising Cascade and Coast Ranges, and became progressively more arid during Pliocene. *Subject Headings:* **Climatic changes, Paleoclimates, Nevada, California.**

G–97 551.583:581.9

Discussion on the origin and relationships of the British flora. *Royal Society of London, Proceedings,* B, 118:197–241, **1935. DLC**—Main contributions: Mrs. E. M. Reid, **British floras antecedent to the Great Ice Age**; P. G. H. Boswell, **The Quaternary Ice Age**; M. E. J. Chandler, **The effect of the southern extension of glaciers and ice-sheets on the pre-glacial vegetation**; H. Godwin, **Vegetation phases reconstructed from pollen analysis of peat**; A. J. Wilmott, **Evidence in favor of survival of the British flora in glacial times**; E. J. Salisbury, **Are most of the present British plants post-glacial immigrants from extra-British regions with possibly some human introductions?** Followed by a general discussion. A good deal of palaeoclimatology. *Subject Headings:* **Climatic changes, Quaternary climates, Great Britain.**

G–98 551.583.3

Zeuner, Friedrich E., **The climate of the countries adjoining the ice-sheet of the Pleistocene.** *Geologists' Association, Proceedings,* 48:379–395, **1937. DGS**—Beginning with a detailed study of glacial climate of Starunia in eastern Carpathians, author discusses climate and meteorology of loess and tundra belts of Europe. *Subject Headings:* **Climatic changes, Loess, Tundra, Quaternary climates, Europe.**

G–99 551.583:561.1

Chaney, Ralph W. and others, **A summary of the climatic data in the papers on Cenozoic Paleontology of western North America.** University of California, Berkeley, Department of Paleontology, distributed by Blue Hill Observatory, 1938. 12 p. Mimeographed. **DLC**—Summarizes climatic conditions inferred from fossil plants in various deposits on Pacific coast and western interior from Lower Eocene to Pleistocene. *Subject Headings:* **Climatic changes, Paleoclimates, Pacific Coast, Western States.**

G–100 551.583.3:525.3:52

†Zeuner, Friedrich E., **Die Chronologie des Pleistozäns.** [The chronology of the Pleistocene.] *Srpska kral'evska akademija, Belgrade,* (Académie des Sciences Mathématiques et Naturelles, Bulletin), B, No. 4; **1938.** 79 p.—A detailed study of much recent literature of Quaternary of Europe and North Africa to show agreement between climatic succession and Milankovitch's radiation curve. Importance of secondary effects recognized. A very full classified bibliography. *Subject Headings:* **Climatic changes, Quaternary climates, Europe, North Africa.**

G–101 551.583.3(57

Obrutschev, S.,

[Past glaciation and Quaternary history of Chukchee Land.] *Akademiia Nauk, SSSR, Izvestiia Ser. Geogr. i Geofiz.*, 2:129–146, **1939.** Russian with English summary. **DLC**—Describes climatic variations and marine transgressions and regressions from Upper Pliocene to late Glacial. Eustatic sea movements very important. Two glaciations [? Riss, Wurm], second less important. *Subject Headings:* **Climatic changes, Paleoclimates, Quaternary climates, Glaciation.**

G–102 551.583.3

Paterson, T. T., **On a world correlation of the Pleistocene.** *Royal Society of Edinburgh, Transactions*, 60:373–425, **1939–42. DLC**—Recognizes five glaciations and pluvials, Gunz 1–2, Minde 1–2, Riss 1–2, Wurm 1–2, Wurm 3, and compares Alpine and North German glaciations with Lake Rudolf, faunal changes in Europe and Milankovitch's radiation curve. Also finds five cycles o erosion-deposition in river basins which he attributes to variation of "power-volume" of river (orogenic+rainfall). Accepts Simpson's theory of variations of solar radiation but includes glacial anticyclones. *Subject Headings:* **Climatic changes, Glacial periods, Europe.**

G–103 551.583.3

Bryan, Kirk and Ray, Louis L., **Geologic antiquity of the Lindenmeier site in Colorado.** *Smithsonian Miscellaneous Collections*, 99, No. 2, Washington, D. C., **1940.** 76 p. 6 plates. **DLC**—Discussion of age of site (Folsom culture) leads to investigation of chronology of Wisconsin in America. *Subject Headings:* **Climatic changes, Colorado.**

G–104 551.583.3(54

Nilsson, Eric, **Die Eiszeit in Indien.** [The Ice Age in India.] *Geografiska Annaler*, 23:1–23 **1941. DLC**—Recognizes four glaciations and three interglacials in Kashmir, correlated with terraces in Punjab and archaeologically with East Africa, Egypt, Palestine and Europe. Fourth glaciation included four advances. *Subject Headings:* **Climatic changes, Glacial periods, India.**

G–105 551.583.7(94

Süssmilch, C. A., **The climate of Australia in past ages.** *Royal Society of New South Wales Journal and Proceedings*, 75:47–64, **1941. DLC**—A detailed summary from Archaeozoic to Present. The results are shown in a curve of temperature, with glaciations in older Archaeozoic, Proterozoic (two), Carboniferous—Permian, Lower Cretaceous and Pleistocene. Another diagram generalizes changes of rainfall and temperature in Queensland since Miocene. *Subject Headings:* **Climatic changes, Glaciation, Australia.**

G–106 551.583.3:551.513

Grigor'ev, A. A., **Tsirkuliatsiia atmosfery v period maksimal'nogo oledeneniia kak baza dlia rekonstruktsii klimata lednikovoi epokhi.** [The atmospheric circulation in the period of maximum glaciation as a basis for the reconstruction of the climate of the Ice Age.] *Problemy Fizicheskoi Geografii*, 11:43–58, **1942.** Also in *Problemy Paleogeografii Chetvertichnogo Perioda, Akademiia Nauk, SSSR, Institut Geografii, Trudy*, No. 37:19–34, 1946. In Russian, German summary p 57–58. **DLC**—Development of ice-sheets only possible with higher temperature in lower latitudes of Atlantic, due to increased solar radiation. Cold dry air masses from ice-sheets intensified quasi-stationary anticyclones and gave Europe a low temperature, but in central Asia summer temperatures resembled present and glaciation was slight. Mountain glaciation of East Siberia and Far East reached its maximum after peak of European glaciation. *Subject Headings:* **Climatic changes, Quaternary climates, Solar radiation, Europe, Asia.**

G–107 551.583.3(7

Flint, Richard Foster, **Growth of North American ice sheet during the Wisconsin age.** *Geological Society of America, Bulletin*, 54:325–362, **1943. DLC**—Labradorean and Keewatin ice-sheets were separate only in very late Wisconsin; before that a single Laurentide sheet existed, originating as valley glaciers in highlands of East Quebec, Labrador and Baffin Island and fed by south and west

winds. The ice formed broad low domes caused by exceptional concentrations of snowfall. Cordilleran glacial complex a separate system. *Subject Headings:* **Climatic changes, Glacial periods, North America.**

G–108 551.583.733/4:551.8

Ma, Ting Ying H., **Research on the past climate and continental drift.** 3 Vols. Yungan, Fukien, China, The author, **1943.** 21 plates. **DLC**—Discusses the climate and relative position of the continents in Ordovician and Devonian. *Subject Headings:* **Climatic changes, Paleoclimates, Continental drift.**

G–109 551.583.3:551.513

Antevs, Ernst, **Correlation of Wisconsin glacial maxima.** *American Journal of Science*, 243A:1–39, **1945. DLC**—A study of fluctuations of North American ice-sheets due to interaction with tracks of depressions. Glaciation started on mountains of West Canada and spread over plains to east, fed by depressions crossing Rocky Mountains (depressed 2,000–3,000 feet) between 54°N. and St. Elias Range. This and Scandinavian ice displaced Icelandic low southwards and NE winds caused glaciation of Labrador. Southward shifting tracks and permanent Aleutian low caused glaciation and pluvial period in western U. S. A., but starved northern ice-sheets causing regression followed by regeneration. *Subject Headings:* **Climatic changes, Glacial periods, North America.**

G–110 551.583.3:529

Flint, Richard Foster, **Chronology of the Pleistocene epoch.** *Florida Academy of Sciences, Quarterly Journal*, 8:1–34, **1945. DLC**—Discusses various methods of calculating dates of glacial epochs which mostly give ages of about 700,000 years since Kansan, but no absolute dating yet accomplished. Length of whole Pleistocene probably between one and five million years. *Subject Headings:* **Climatic changes, Glacial periods, Quaternary climates.**

G–111 551.583.3(57)

Flint, Richard Foster and Dorsey, Herbert G., Jr., **Glaciation of Siberia.** *Geological Society of America, Bulletin*, 56:89–106, **1945. DLC**—Authors consider that there was an extensive but thin ice sheet in N.W. Siberia corresponding with Riss but probably developing earlier. This extended over the Arctic shelf and included Franz Joseph Land and Novaya Zemlya in a barrier continuous with Scandinavian ice. In south and east extensive piedmont glaciers. In Wurm ice was much less extensive. Glaciation attributed to lower temperature. Frozen ground post-glacial. *Subject Headings:* **Climatic changes, Glacial periods, Siberia.**

G–112 551.583.3:551.513(7)

Flint, Richard Foster and Dorsey, Herbert G., Jr., **Iowan and Tazewell drifts and the North American ice-sheet.** *American Journal of Science*, 243:627–636, **1945. DLC**—Growth of American ice-sheets related to variations of circulation index. Changes from strong to weak circulation patterns and their effect on direction of expansion of ice-sheets followed in detail. *Subject Headings:* **Climatic changes, Glacial periods, North America.**

G–113 551.583.3:525.3:529

†Zeuner, Frederick E., **The Pleistocene period; its climate, chronology and faunal successions.** *Ray Society, London*, **1945.** 322 p. **DLC**—Begins with a study of Pleistocene stratigraphy and climate. Glaciations are named: Early, Antepenultimate, Penultimate and Last, and correlation Alps—Scandinavia—British Isles—North America is given. Author then sets out Milankovitch's astronomical theory and correlates variations of radiation with observed sequence; Early Glaciation I is dated 590,000 years ago. Chap. VII deals with Upper Pleistocene climate of Mediterranean, chap. VIII applies astronomical theory to tropical Africa. Finally author discusses world-wide fluctuations of sea level and finds a decrease of maxima from Sicilian (+100 meters) to Late Mousterian (+7.5 m.), linear with time. This is used to date raised beaches in other parts of the world. *Subject Headings:* **Climatic changes, Glacial periods, Quaternary climates.**

G–114 551.583.3(02)

†Flint, Richard Foster, **Glacial geology and the Pleistocene epoch.** New York, J. Wiley; London, Chapman and Hall, **1947.** 589 p. numerous refs., p. 536–575, 6 folded plates. **DLC**—Chapters 1–4 describe existing glaciers; 5, Glacial erosion and transport; 6, Glacially sculptured landscapes; 7, 8, Glacial drift; 9, Expansion and shrinkage of glaciers inferred from drift; 10, Glacial drainage and eolian deposits; 11, Glacial stratigraphy; 12, Glaciation of North America in Wisconsin; 13, 14, Wisconsin and pre-Wisconsin stratigraphy of North America; 15, 16, Former glaciers and glacial stratigraphy of Europe; 17, Glaciation outside North America and Europe; 18, Pleistocene chronology; 19, Changes of level; 20, Glacial and interglacial climates; 21, Climates since the maxi-

mum of the fourth glacial age; 22, Causes of climatic fluctuations; 23, The fossil record. *Subject Headings:* **Climatic changes, Glacial periods, Textbooks.**

G–115 551.583.3:551.52

Poser, Hans, **Auftautiefe und Frostzerrung im Boden Mitteleuropas während der Wurm-Eiszeit.** [Thaw depth and frost displacements in the ground of Central Europe during the Wurm Glaciation.] *Naturwissenschaften*, 34:232–238, 262–267, **1947. DLC**—Constructs charts of the depths of winter freezing and summer thawing in Europe from traces of frost action in the soil. The coldest region was between the Scandinavian and Alpine ice. The atmospheric circulation in January and July is reconstructed from the temperature distribution. *Subject Headings:* **Climatic changes, Glacial periods, Europe.**

G–116 551.583.3:551.465:551.5

Behrmann, Walter, **Golfstrom und Eiszeit.** [Gulf Stream and Ice Age.] *Petermanns Geographische Mitteilungen*, 92:154–158, **1948. DLC**—Argues that glaciation of Norway required open water in northern North Sea to provide snowfall. Shape of ice-sheet shows the same. Hence Gulf Stream could not have been shut off by the elevation of a ridge between Iceland and Scotland. *Subject Headings:* **Climatic changes, Glacial periods, Norway.**

G–117 551.583.3

Washington, D. C., National Research Council, Committee on Inter-relations of Pleistocene Research, **Pleistocene Research.** *Geological Society of America, Bulletin*, 60:1303–1525, **1949. DLC**—Introduction by R. F. Flint; 11 summaries of present state of knowledge include: Edward S. Deevey, Jr., **Biogeography in the Pleistocene,** p. 1315–1416; Helmut Landsberg, **Climatology of the Pleistocene,** p. 1437–1442; Fred B. Phleger, **Submarine geology and Pleistocene research,** p. 1457–1462; H. T. U. Smith, **Physical effects of Pleistocene climatic changes in nonglaciated areas; eolian phenomena; frost action and stream terracing,** p. 1485–1516. *Subject Headings:* **Climatic changes, Quaternary climates.**

SECTION III. CLIMATIC CHANGES IN THE POST-GLACIAL AND HISTORICAL PERIODS

G–118 551.583.2(481

Blytt, Axel, **Forsög til en Theori om Invandringen af Norges Flora under vexlende regnfulde og tørre Tider.** [Essay on the immigration of the Norwegian flora during alternating rainy and dry periods.] *Nyt Magazin for Naturvidenskaberne*, 21:278–363, **1876.** Also: **Die Theorie der wechselnden kontinentalen und insularen Klimate.** [The theory of alternating continental and insular climate.] *Engler's Botanisches Jahrbuch, Leipzig*, 2:1–50, **1881.** chart, append. p. 177–184. **DLC**—A historical work. Flora of Norway can be divided into groups of continental and insular origin (Arctic, Later Arctic-alpine, Subarctic, Boreal, Atlantic, Subboreal and Subatlantic) which immigrated under different climates. The structure of peat-bogs in Norway shows a corresponding alternation of xerophile and hygrophile plants, and of peat formation and forest beds. He also investigated old shorelines and correlated high and low sea levels with his moist and dry periods. *Subject Headings:* **Climatic changes, Historical climates, Norway.**

G–119 551.583.2 551.583.1

Brückner, Eduard, **Klimaschwankungen seit 1700 nebst Bemerkungen über die Klimaschwankungen der Diluvialzeit.** [Climatic oscillations since 1700 with remarks on the climatic oscillations of the Ice Age.] *Geographische Abhandlungen*, 4:155–484, **1890. DLC**—Chap. 1 sets out position in 1890 including belief in general constancy of temperature in historical times. Chap. 2 sets out variations in level of Caspian and other salt lakes, and rivers. Chaps. 5–7 describe secular variation in rainfall, pressure and temperature. In chap. 8 author describes the 35-year oscillation now known as the Brückner cycle from 1000 to 1885 A.D. and chap. 9 emphasizes the importance of climatic cycles. Chap. 10 describes oscillations during Glacial period; general climate 3–4°C. colder and locally moister. Causes of oscillations unknown. *Subject Headings:* **Climatic changes, Historical climates, Cycles.**

G–120 551.583.2(485

Andersson, Gunnar, **Svenska Växtvärldens Historia.** Stockholm, **1896.** *Also as:* **Die Geschichte der Vegetation Schwedens.** [The history of Swedish vegetation.] *Engler's Botanische Jahrbuch*, 22, No. 2, **1896. DA**—Sets out post-glacial succession of vegetation—immigration of Arctic flora, then birch and aspen, closely followed by fir, then oak in southern lowlands, lime and hornbeam and alder (beech in south). Distribution of hazel shows post-glacial optimum. Correlation with Baltic stages given. *Subject Headings:* **Climatic changes, Historical climates, Sweden**

G–121 551.583.2:551.526(481)

Brögger, W. C., **Om de senglaciale og postglaciale nivåforandringer i Kristiania feltet.** [On the late-glacial and post-glacial changes of level in the Kristiana [Oslo] region.] *Norges Geologiske Undersögelse, Kristiania,* No. 31, **1900–01.** 731 p. In Norwegian, German summary. **DLC**—A detailed study of the marine shell beds and shore lines from the last interglacial to the present. Ocean temperatures are estimated from the characteristic species and the frequency of Arctic, boreal and lusitanian forms. *Subject Headings:* **Climatic changes, Historical climates, Norway**

G–122 551.583.2(09)(4)

Hennig, R., **Katalog bemerkenswerter Witterungsereignisse von den ältesten Zeiten bis zum Jahre 1800.** [Catalogue of the most remarkable weather phenomena from the oldest times to the year 1800.] Berlin, *Preussisches Meteorologisches Institut, Abhandlungen,* 2, No. 4, **1904.** 93 p. **DLC**—A comprehensive but rather uncritical collection of literary records of weather in Europe. Earliest reference ca. 1754 B.C. (Ogygian flood). Geographical index. *Subject Headings:* **Climatic changes, Historical climates, History, Europe.**

G–123 551.583.2:553.97(411)

Lewis, Francis J., **The history of the Scottish peat-mosses and their relation to the Glacial period.** *Scottish Geographical Magazine,* 22:241–252, **1906. DLC**—An important early study of macro-remains. The sequence found is: 1, Birch forest (lower buried forest); 2, Arctic plant beds, 2a, wet moorland; 3, pine forest (upper buried forest), 3a, wet moorland. Compared with J. Geikie's late-glacial stages. *See item* G–62. *Subject Headings:* **Climatic changes, Historical climates, Bogs, Scotland.**

G–124 551.583.2(09)(58)

†Huntington, Ellsworth, **The pulse of Asia.** New York and Boston, Houghton, Mifflin, **1907.** 415 p. numerous photos, fold. plates. **DLC**—A study of climatic variations in the interior of southwestern and central Asia during historic times, based on explorations, critical analysis of legends, accounts of ancient journeys and studies of lake and river fluctuations. Includes chapters on Lop Nor, the ancient climate of Iran, and the Caspian Sea and its neighbors. The curve of rainfall deduced from the Caspian (high up to 400 A.D., low 400–750, high 750–1400, then decreasing) is regarded as applicable to all western and central Asia and the results obtained in preceding chapters are summarized on this basis. The last chapter interprets history in the light of climatic change. *Subject Headings:* **Climatic changes, Historical climates, Asia.**

G–125 551.583.2(58)

Berg, Leo, **Das Problem der Klimaänderungen in geschichtlicher Zeit.** [The problem of climatic change in historic time.] *Geographische Abhandlungen,* 10, No. 2, **1914.** Also: **Über die Veränderungen des Klimas in historischer Zeit.** [On variations of climate in historic time.] *Zemlevedenie,* No. 3, p. 23–120, **1914. DWB**—Discusses variations of climate in Aralo-Caspian region. Against progressive desiccation; a drier and warmer period preceded the present. *Subject Headings:* **Climatic changes, Historical climates, Central Asia.**

G–126 551.583.2:061.3

Internationaler Geologenkongress, **Die Veränderungen des Klimas seit dem Maximum der letzten Eiszeit. Eine Sammlung von Berichten unter Mitwirkung von Fachgenossen in verschiedenen Ländern.** [The changes of climate since the maximum of the last Ice Age. A collection of reports with the assistance of colleagues in different countries.] Stockholm, Gen. Litogr. Anst., **1910.** 459 p. **DLC**—A collection of 45 papers covering the world from Arctic to Antarctic, which provided the first great body of data about climatic changes during the post-glacial, and is still a valuable source. Special mention should be made of: General summary, by Gunnar Andersson, p. xiv–lvi; Changes of climate since the last ice-age in Germany, summary by F. Wahnschaffe (German), p. 1–22; Post-glacial climatic changes and climatic oscillations in the region of the Alps, by E. Brückner (German), p. 97–111; The Swedish peat-bogs as indicators of post-glacial climatic oscillations, by R. Sernander (German), p. 195–246; Swedish climate in the late-Quaternary period, by Gunnar Andersson, p. 247–294; A thermographical record of the late-Quaternary climate, by G. de Geer [A study of recession varves]; A brief summary of the evidence furnished by glacial phenomena and fossiliferous deposits in Norway as to late-Quaternary climate, by P. A. Øyen, p. 339–344 [first correlates Blytt's periods (*item* G–118) with marine levels from Arctic *Mytilus*-level to recent]; Certain geological phenomena indicative of climatic conditions in North America since the maximum of the latest glaciation, by Wm. C. Alden, p. 353–364 [recessional moraines, loess, lake fluctuations]. *Subject Headings:* **Climatic changes, Quaternary climates.**

G–127 551.583.2(61

Negro, Carlo, Sul clima della Libia attraverso i tempi storici. [On the climate of Libya durin historic time.] Prolegomeni and Memorias 2, 3. *Rome, Memoria Accademie Nuovi Lincei, Se 2, 1,* **1913, 1915**; *2,* **1916. DLC**—An exhaustive discussion of literary and historical records fro Roman times. Author considers that there has been no progressive desiccation of Libya during th historical period. *Subject Headings:* **Climatic changes, Historical climates, Libya.**

G–128 551.583.2:525.

Pettersson, Otto, **Climatic variations in historic and prehistoric time.** *Göteborg, Svenska Hydrc grafisk-Biologiska Skriften,* No. 5, **1914.** 25 p. plate. **DLC**—Variations of climate since abou 4,000 B.C. attributed to a lunar-solar cycle of about 1700 years in submarine tides entering Arcti Ocean and causing variations of amount of ice drifting into Atlantic. The favorable ice condition of Norse occupation of Greenland in 10th Century occurred at a minimum of tidal force; deterioratio was due to approach to tidal maximum in A.D. 1433. *Subject Headings:* **Climatic changes, Historica climates, Solar influences, Lunar influences.**

G–129 551.583.2:551.513(7

Huntington, Ellsworth, **The climatic factor as illustrated in arid America.** *Carnegie Institu Publication,* No. 192, Washington, D. C., **1914.** 341 p. **DLC**—Sets out results of investigation into climatic changes in past 3000 years (tree rings, Maya ruins, etc.) in California, Arizona, Ne Mexico, Mexico, Yucatan and Guatemala. Concludes that there have been numerous "pulsations of climate due to strengthening and weakening of atmospheric circulation and shift of storm belts Simultaneous changes have taken place over whole Northern Hemisphere. *Subject Heading* **Climatic changes, Historical climates, Dendrochronology, Western North America, Central America**

G–130 551.583.2(62

Hellmann, Gustav, **Über die ägyptischen Witterungsangaben im Kalendar von Claudiu Ptolomaeus.** [On the Egyptian weather data in the Calendar of Claudius Ptolemy.] *Preussisch Akademie der Wissenschaften, Sitzungsbericht,* 13:322–341, **1916.** Sawyer, L. D., **Note on Egyptia winds in Ptolemy's 'Prognostics' and Hellmann's criticism of them.** *Royal Meteorological Society Quarterly Journal,* 57:26–27, **1931. DLC**—Hellmann analyzed the meteorological data in a astronomical-meteorological calendar prepared by Claudius Ptolemy in Egypt, probably at Alex andria in the 2nd Century A.D. This shows an abnormal frequency of winds from S and W, com paratively frequent hail and thunder, rain and weather changes even in summer. The difference from present weather are so great that Hellmann doubts whether the calendar refers to Alexandria Miss Sawyer criticized Hellmann's treatment of the winds and constructed a revised table. *Subje Headings:* **Climatic changes, Historical climates, Egypt.**

G–131 551.583.2(09

Huntington, Ellsworth, **Civilization and climate.** New Haven, Yale Univ. Press, **1916.** 333 p. 3rd ed., Hartford, **1924.** 453 p. **DLC**—Calculates energy values of different climates and draw maps of present level of civilization for comparison. These are used to show that former changes i centers of civilization were due to world-wide changes of climate. *Subject Headings:* **Climati changes, Historical climates.**

G–132 551.583.2(48

Post, Lennart von, **Skogsträdspollen i sydsvenska torfmosselagerföljder.** [Pollen of fores tress in the sequence of peat mosses in South Sweden.] *Förhandlingar ved* 16 *Skand. Naturfo skermöte,* **1916. DA**—The first account of the method, developed by von Post, of studying change of forest composition by the microscopical examination of pollen grains in deposits. This has sinc become of great importance for climatology. *Subject Headings:* **Climatic changes, Historical climates Pollen analysis, Sweden.**

G–133 551.583.2:517.512.

Douglass, Andrew E., **Climatic cycles and tree growth. A study of the annual rings of trees i relation to climate and solar activity.** 3 Vols. *Carnegie Institute Publication* No. 289, Washingtor D. C., **1919.** 126 p. **1928.** 166 p. **1936.** 171 p. **DLC**—Vol. I is an interim report dealin mainly with relations between tree rings and rainfall, and measurements of 230 trees (76,000 rings Vols. II and III deal mainly with periodogram analysis of data; Pueblo chronology and periodicitie in laminated geological deposits are also discussed. *Subject Headings:* **Climatic changes, Historica climates, Dendrochronology, Rainfall periodicities.**

G–134 551.583.2:553.97(489

Jessen, Knud, **Moseundersøgelser i det nordøstlige Sjaelland. Med Bemaerkener om Traeer og Buskes Invandring og Vegetationens Historie.** [Bog investigations in northeast Sjaellanc

With remarks on the immigration of trees and shrubs and the history of the vegetation.] København, Danmarks geologiske Undersøgelse 2, No. 34, **1920.** 269 p. English summary p. 243–269. **DLC**—Parts I–III describe bogs in Rude and Grib forests and submarine bogs and freshwater beds. Part IV gives list of plant and animal remains. Parts V–VII survey the stratigraphy, climatic succession and history of the vegetation (Late-glacial, Post-glacial, Pine forest period, Mixed oak forest period, Beech forest period). A detailed correlation table is given. *Subject Headings:* **Climatic changes, Historical climates, Bogs, Denmark.**

G–135 551.583.2(494)

Gams, Helmut, **Die Waldklimate der Schweizeralpen, ihre Darstellung und ihre Geschichte.** [The forest climate of the Swiss Alps, its origin and history.] *Naturforschende Gesellschaft*, 35:262–276, **1923.** fold. plate. **DLC**—After comparing present forests with rainfall, author constructs post-glacial climatic history of the Alps. The climatic deterioration at the beginning of the Subatlantic is fully treated. *Subject Headings:* **Climatic changes, Historical climates, Alps.**

G–136 551.583.2

†Gams, Helmut and Nordhagen, Rolf, **Postglaziale Klimaänderungen und Erdkrustenbewegungen in Mitteleuropa.** [Post-glacial climatic changes and movements of the earth's crust in central Europe.] *Geographische Gesellschaft, Landeskundliche Forschungen*, Munich, 25, **1923.** 336 p. fold. plate of post-glacial correlation, biblio. p. 309–331. **DLC**—A valuable summary of data. Part I describes post-glacial deposits of Central Europe region by region. Part II summarizes the succession in 1, Norway, Sweden and Denmark; 2, Northwest European and Arctic islands (including British Is.; 3, Eastern Europe; 4, North and central Germany and Netherlands; 5, France and Italy; 6, Southern and eastern Mediterranean and Orient; 7, North America. Part III summarizes results for Glacial, Late-glacial and Post-glacial periods. A new glaciation, the Mühlbergian, is introduced between Mindel and Riss. *Subject Headings:* **Climatic changes, Historical climates.**

G–137 551.583.2(09)

Hovgaard, William, **The Norsemen in Greenland. Recent discoveries at Herjolfsnes.** *Geographical Review*, 15:605–616, **1925. DLC**—Discusses the civilization of Greenland at end of 10th Century A.D., its gradual breakdown and final extinction, attributed to deterioration of climate and increase of ice drift. *Subject Headings:* **Climatic changes, Historical climates, Sea ice, Greenland.**

G–138 551.583.2 551.311.18

Nansen, Fridtjof, **Klimat-vekslinger i Nordens historie.** [Climatic changes in the history of Norway.] *Norske Videnskaps Akademie i Oslo, Avhandlinger (Mat.-Nat. Kl.)*, 1, No. 3, **1925.** 63 p. **DLC**—Deals mainly with climate and ice conditions since Middle Ages in Greenland, Iceland and Baltic. *Subject Headings:* **Climatic changes, Historical climates, Arctic.**

G–139 551.583.2:58

Stark, P., **Der gegenwärtige Stand der pollenanalytischen Forschung.** [The present position of pollen-analytical investigation.] *Zeitschrift für Botanik*, Jena, 17:89–125, **1925. DA**—Post-glacial succession in many small districts of Europe discussed in detail and a correlation worked out with Blytt-Sernander scheme. *Subject Headings:* **Climatic changes, Historical climates, Pollen analysis, Europe.**

G–140 551.583.2:551.579.4(62)

*Umar Tusun, Prince, (Toussoun, Omar), **Mémoire sur l'histoire du Nil.** [Memoir on the history of the Nile.] Institut Français d'Archéologie Orientale, Cairo, **1925.** 3 Vols. **DLC**—Gives variations of level of Nile floods and discussion. General estimates of level for 5th Century B.C., 1st, 2nd and 4th Centuries A.D. Regular annual readings of flood gages A.D. 641–1480. Broken record of flood levels 1480–1830, then complete to date. Some records of low-level stage, mainly 641–1480. Useful historical data. *Subject Headings:* **Climatic variations, Historical climates, Nile floods, Egypt.**

G–141 551.583.2(73)

Quaternary climates. *Carnegie Institution of Washington Publication*, 352, **1925.** 212 p. **DLC**—Includes: **Geologic history of Lake Lahontan,** by J. Claude Jones, p. 3–50, 6 plates; **On the Pleistocene history of the Great Basin,** by Ernst Antevs, p. 51–114; **The Big Tree as a climatic measure,** by Ernst Antevs, p. 115–153; **Tree growth and climatic interpretations,** by Ellsworth Huntington, p. 155–204. Combined index. The four papers together cover the Pluvial and Post-pluvial climatic changes in the Lahontan, Bonneville and Mono Basins, including successive lake stages, calculations of age of present lakes from salt content, and recent fluctuations of rainfall. *Subject Headings:* **Climatic changes, Historical climates, Great Basin.**

G–142 551.583.2(51)

Chu, Co-ching, **Climatic pulsations during historic time in China.** *Geographical Review*, 16:274–282, 1926. **DLC**—Analyzes data in Chinese archives since A.D. 100 by centuries; 4th, 6th, 7th, 15th and 16th dry, 2nd, 3rd, 8th, 12th, 14th wet. Emigration greatest in 7th, 15th and 19th Centuries. Also analyzes numbers of severe winters and dates of latest spring snowfall. *Subject Headings:* **Climatic variations, Historical climates, China.**

G–143 551.583.2:58(4)

†Gams, Helmut, **Die Ergebnisse der pollenanalytischen Forschung in Bezug auf die Geschichte der Vegetation und des Klimas von Europa.** [The results of pollen-analysis investigation in relation to the history of vegetation and of the climate of Europe.] *Zeitschrift für Gletscherkunde*, 15:161–190, 1927. **DLC**—After setting out pollen evidence, author gives a clear account of his views about the climatic succession in Europe from glacial to present. Exhaustive bibliography. *Subject Headings:* **Climatic changes, Historical climates, Pollen analysis, Europe.**

G–144 551.583.2:551.524.35(09)(4)

†Easton, C., **Les hivers dans l'Europe occidentale. Étude statistique et historique sur leur température: discussion des observations thermométriques 1852–1916 et 1757–1851: tableaux comparatifs: classification des hivers 1205–1916: notices historiques sur les hivers remarquables: bibliographie.** [Winters in western Europe. Statistical and historical study of their temperature: discussion of thermometric observations 1852–1916 and 1757–1851: comparative tables: classification of winters 1205–1916: historical notices on remarkable winters: bibliography.] Leyde, E. J. Brill 1928. 210 p. **DLC**—The standard compilation on severity of winters from 396 B.C. *Subject Headings:* **Climatic variations, Historical climates, History, Western Europe.**

G–145 551.583.2:58(4)

†Erdtman, G., **Studies in the postarctic history of the forests of northwestern Europe. I. Investigations in the British Isles. II. Untersuchungen in nordwest Deutschland und Holland.** [Investigations in northwest Germany and Holland.] **III. Récherches dans la Belgique et au nord de la France.** [Investigations in Belgium and northern France.] *Geologiska Föreningen i Stockholm, Förhandlingar*, 50:123–192, 368–380, 419–428, 1928. **DLC**—A large number of stratified sections and pollen spectra from peat bogs are described and conclusions as to changes of climate drawn. Extensive bibliographies. *Subject Headings:* **Climatic changes, Historical climates, Northwest Europe.**

G–146 551.583.13 551.583.2

Schostakowitsch, W. B., **Die Sonnenflecken. Periodicität in der Naturerscheinungen.** [Sunspots. Periodicities in natural phenomena.] Irkutsk, 1928. 80 p. Russian and German. **DWB**—Collects a great deal of material, instrumental and historical, about periodicities of various lengths up to 425 years. *Subject Headings:* **Climatic changes, Historical climates, Sunspots, Cycles.**

G–147 551.583.2:553.97(4)

Weber, C. A., **Grenzhorizont und Klimaschwankung.** [Boundary layer and climatic oscillation.] *Naturwissenschaftlicher Verein, Bremen, Abhandlungen*, 26:97–106, 1928. **DLC**—Over a large part of Europe bogs show two layers of *Sphagnum* peat separated by a thin layer of cottongrass and heather peat. Author termed this "Grenzhorizont" [Boundary layer] and considered that it represented a dry period of at least 1,000 years between two rainy periods. The Grenzhorizont has since played a large part in discussions of climatic change. *Subject Headings:* **Climatic changes, Historical climates, Bogs, Europe.**

G–148 551.583.2:58(41)

Erdtman, G., **Some aspects of the post-glacial history of British forests.** *Journal of Ecology*, 17:112–126, 1929. **DA**—The rapid evolution of forests in Pre-boreal and Boreal time is described. Correlation tables are given for England and Wales, Isle of Man, Ireland and Scotland. *Subject Headings:* **Climatic changes, Historical climates, Great Britain.**

G–149 551.583.2:58(494)

Stark, P., **Die pollenanalytische Durchforschung der Schweiz.** [The pollen-analytical exploration of Switzerland.] *Zeitschrift für Botanik*, Jena, 21:296–323, 1929. **DA**—Summary of forest succession in different parts of the Alpine region, compared with neighboring parts of Europe. Effect of variations of continentality important. *Subject Headings:* **Climatic changes, Historical climates, Continentality, Pollen analysis, Alps.**

G–150 551.583.2:58(42)

†Woodhead, T. W., **History of the vegetation of the southern Pennines.** *Journal of Ecology*, 17:1–34, 1929. 16 photos, 110 refs. **DLC**—A general account of the glacial and post-glacial history of the region, especially the formation and degeneration of peat. Forest degenerated on summit plateau 4000–3000 B.C. *Subject Headings:* **Climatic changes, Historical climates, Pennines.**

G–151 551.583.2(4)

Gross, H., **Das Problem der nacheiszeitlichen Klima- und Florenentwicklung in Nord- und Mitteleuropa.** [The problem of post-glacial climatic and floral development in North and Central Europe.] *Botanisches Zentralblatt, Prague, Beiheft*, 47:1–110, **1930. DA**—After a full summary of various authors on climatic divisions of post-glacial, author abandons Blytt-Sernander scheme and proposes: A. Late-Glacial: 1. Baltic Ice Lake (Arctic); 2. Yoldia period (subarctic) 8300–7800 B.C. B. Post-glacial: I, Warm period, 3, Ancylus period (Hazel, pine, 7800–5600); 4. Litorina period (Mixed Oak Forest, 5600–2000 with two substages); 5. First half of Limnaea period, climatic deterioration, 2000–500 B.C. II, Cool period, 6, Second half of Limnaea period, Mya period, 500 B.C. —present. *Subject Headings:* **Climatic changes, Historical climates, Europe.**

G–152 551.583.2:58(4)

Rudolph, K., **Grundzüge der nacheiszeitlichen Waldgeschichte Mitteleuropas (Bisherige Ergebnisse der Pollenanalyse).** [Bases of post-glacial forest history (Results of pollen analyses to date).] *Botanisches Zentralblatt, Prague, Beiheft* 47:111–176, **1930.**—Study of several hundred works shows agreement on succession in Europe: Pre-boreal; Boreal, Hazel phase, Mesolithic; Atlantic, EMW [Mixed oak forest], early and mid-Neolithic; Subboreal, Beech phase I, late Neolithic and Bronze; Subatlantic, Beech phase II, Iron Age to historic. Local variations lead to concept of basic forest successions in seven different regions. Regularity over large areas points to dominant effect of climatic changes, but some difficulties remain and possible climatic solutions are discussed. *Subject Headings:* **Climatic changes, Historical climates, Pollen analysis.**

G–153 551.583.2:58(922)

Berlage, H. P., Jr., **Over het verband tusschen de dikte der jaarringen van djatiboomen (*Tectona grandis L. f.*) en den regenval op Java.** [On the relation between the width of annual rings of teak trees and rainfall in Java.] *Tectona*, Buitenzorg, (Java), 24:939–953, Oct. **1931. DA**—Growth of teak varies with duration of rainy season. Annual values are given 1514–1929. *Subject Headings:* **Climatic changes, Dendrochronology, Java.**

G–154 551.583.2:551.481(43)

Oberdorfer, E., **Die postglaziale Klima- und Vegetationsgeschichte des Schluchsees (Schwarzwald).** [The post-glacial climatic and vegetation history of Schluch Lake (Black Forest).] *Naturforschende Gesellschaft, Bericht*, 31:1–86, **1931. DA**—The lake, including deposits below water level, was studied in detail. The water level was high in Atlantic but low in Boreal (−1.25 meters) and Subboreal. The Pre-boreal is subdivided into cool and warm stages. The Subatlantic was characterized by sudden flooding. An important work. *Subject Headings:* **Climatic changes, Historical climates, Lakes, Germany.**

G–155 551.583.2(72)

Sapper, Karl, **Klimaänderungen und das alte Mayareich.** [Climatic changes and the Old Maya kingdom.] *Beiträge zur Geophysik*, (Köppenband), 34:333–353, **1931. DLC**—Summarizes climatic changes from before 400 B.C. (very dry winters). Climatic deterioration began in south before 300 A.D. Improvement 900–1100 A.D., deterioration 1100–1300, slight improvement 1300–1450, then unfavorable. *Subject Headings:* **Climatic changes, Historical climates, Central America.**

G–156 551.583.2:551.48(62)

Caton-Thompson, G. and Gardner, E. W., **The prehistoric geography of Kharga Oasis.** *Geographical Journal*, London, 80:371–406, **1932.** Gardner, Elinor W., **Some problems of the Pleistocene hydrography of Kharga Oasis, Egypt.** *Geological Magazine*, London, 59:386–421, 1932. **DGS**—Pleistocene Kharga depression was supplied by springs which formed mounds. Neolithic was more arid but with frequent violent rainstorms; dune sand covered the dying springs. Climate was dry until 525 B.C.; and artesian supply was opened up by the Persians and maintained until 640 A.D. After 640 there was progressive deterioration. Criticized by H. Beadnell in *Geographical Journal*, London, 81:128–134, **1933,** with reply by Caton-Thompson p. 134–139. *Subject Headings:* **Climatic changes, Historical climates, Egypt.**

G–157 551.583.2:553.97(485)

Granlund, Erik, **De Svenska högmossarnasgeologi. Deras Bildnungsbetingelser, Utvecklingshistoria och Utbredning jämte Sambandet mellan Högmossbildnung och Försumpning.** [The

geology of the Swedish high peat bogs. Their conditions of formation, development, history and distribution, with the relation of high moor formation to swamping.] *Stockholm, Sveriges geologiska Undersökning Årsbok, Ser. C*, No. 1, **1932.** 193 p. Abstract in German p. 172–186. **DGS**—An important study of the natural development of peat bogs and the effect of climatic changes. There are a number of "recurrence surfaces" due to variations of average annual rainfall by 50–200 mm. The most marked are dated about 1200 A.D., 400 A.D., 600 B.C., 1200 B.C., 2300 B.C. The inferred changes of climate since 7000 B.C. are summed up in fig. 150. *Subject Headings:* **Climatic changes, Historical climates, Bogs, Sweden.**

G–158 551.583.2:551.311.3(429)

Higgins, Leonard S., **An investigation into the problem of the sand dune areas on the South Wales coast.** *Archaeologia Cambrensis*, p. 26–67, June **1933. DLC**—Sand dunes were formed about 2000 B.C. Periods of advance were due to various factors including storminess. Sand was in motion 400–200 B.C., fixed to within 13th Century A.D., moving from 1300 to 1600, afterwards fixed until about 1818, then some movement. Important for study of variations of atmospheric circulation. *Subject Headings:* **Climatic changes, Historical climates, Wales.**

G–159 551.583.2:58(4)

Brooks, C. E. P., **Post-glacial climates and the forests of Europe. Some problems of modern meteorology no. 16.** *Royal Meteorological Society, Quarterly Journal*, 60:377–395, **1934.** Discussion by H. Godwin, ibid, 61:95–98, **1935. DWB**—Summarizes literature of pollen analysis in Europe and gives charts of tree distribution and a discussion of the changes in post-glacial meteorological situation. *Subject Headings:* **Climatic changes, Historical climates, Europe.**

G–160 551.583.2:551.513(261)

Bryan, Kirk and Cady, R. C., **The pleistocene climate of Bermuda.** *American Journal of Science*, 27(5):241–264, **1934. DLC**—On the basis of successive layers of eolianite and soil the meteorology of the neighborhood of Bermuda and the atmospheric circulation over the North Atlantic are reconstructed during glacial and interglacial periods. *Subjects Headings:* **Climatic changes, Historical climates, Bermuda.**

G–161 551.583.2:551.579.4(47)

Schostakowitsch, W. B., **Bodenablagerungen der Seen und periodische Schwankungen der Naturerscheinungen.** [Bottom deposits of lakes and periodical variations of natural phenomena.] (Repr. from *Mem. Hydr. Institute*, Leningrad. In Russian, German summary.) See also *Meteorological Magazine*, London, 70:134–138, **1935,** and *Meteorologische Zeitschrift* 53:176–181, **1936. DWB**—Contains a table of measurements of annual layers of mud deposits of Lake Saki (west Crimea) dated back to 2294 B.C. Summary in *Meteorological Magazine* gives curve of overlapping 50-year means, showing pronounced maxima about 750–800 A.D. and 1100–1250 A.D. and number of other oscillations, and compares them with tree-rings, peat bogs etc. *Subject Headings:* **Climatic changes, Historical climates, Crimea.**

G–162 551.583.2:551.579.4(495)

Hasluck, Margaret, **A historical sketch of the fluctuations of Lake Ostrovo in West Macedonia.** *Geographical Journal*, London, 87:338–347, **1936. DLC**—Discussion of historical evidence. Lake high in Byzantine days, very low from about late 14th to early 19th Centuries. Irregular rise to max. about 1923. *Subject Headings:* **Climatic changes, Historical climates, Macedonia.**

G–163 551.583.2(09)(41, 415)

†Britton, Charles E., **A meteorological chronology to A.D. 1450.** London, H. M. Stationery Office, **1937.** (Great Britain, *Meteorological Office, Geophysical Memoirs* 8, No. 70.) 176 p. **DLC**—A collection and discussion of references to weather in historical documents, beginning with Irish Annals assigned to B.C. 2668. Refers only to British Isles. Includes index of severe winters, droughts, etc. Good bibliography of classical sources. *Subject Headings:* **Climatic changes, Historical climates, Ireland, Great Britain.**

G–164 551.583.2:553.97(42)

Hardy, E. M., **Studies of the post-glacial history of British vegetation. V. The Shropshire and Flint Maelor mosses.** *New Phytologist*, 38:364–396, **1939. DA**—Finds five "recurrence surfaces" (*see item* G–157) in peat bogs, in late Boreal, mid and uppermost Atlantic, upper Subboreal and mid-Subatlantic. *Subject Headings:* **Climatic changes, Historical climates, Bogs, Great Britain.**

G–165 551.583.2:58(42)

Godwin, H., **Pollen analysis and forest history of England and Wales.** *New Phytologist*, 39:370–400, **1940. DA**—Gives maps of pollen spectra for England for zones IV (Birch-pine), V (Pine), VIa,b,c (Pine-hazel), VIIa,b (Alder-oak-elm-lime) and VIII (Alder-oak-elm-birch-beech, with discussion of climate of each zone and especially Subboreal and Grenzhorizont. In Subboreal) chalk and limestone soils were too dry to carry close woodland and raised bog surfaces were also drier than in Subatlantic, but there is no clearly marked dry period. There are often several boundary surfaces indicating alternation of dry and wet periods. *Subject Headings:* **Climatic changes, Historical climates, Pollen analysis, England, Wales.**

G–166 551.583.2:63(73)

Bryan, Kirk, **Pre-Columbian agriculture in the Southwest, as conditioned by periods of alluviation.** *Association of American Geographers, Annals*, 31(4):219–242, **1941. DLC**—Changes in prosperity of Pueblo communities are attributed partly to cycles of erosion and deposition probably due to changes of rainfall. A flourishing period A.D. 1100–1300 gave place to migrations, attributed to erosion and drought, in 1300–1400. *Subject Headings:* **Climatic changes, Historical climates, Southwest United States.**

G–167 551.583.2:551.548(51)

†Lee, J., **On the palaeoclimate and palaeogeography of the Tarim Basin and western Szechuan, China.** *Meteorological Magazine*, Nanking, 16:111–139, **1942.** 3 plates, biblio. p. 133–139. In Chinese, English abstract p. 111. **DWB, DLC**—A study of the problem of desiccation of the Tarim Basin in historic times. *Subject Headings:* **Climatic changes, Historical climates, China.**

G–168 551.583.2/3:529

†Movius, Hallam L., Jr., **The Irish Stone Age. Its chronology, development and relationships.** Cambridge, University Press, **1942.** 339 p. 59 figs., 7 plates, numerous refs. **DLC**—Part I deals with the chronology and climate of the late-glacial and early post-glacial in northern Europe, Britain and Ireland, set out in detailed tables. *Subject Headings:* **Climatic changes, Historical climates, Ireland, Northwest Europe.**

G–169 551.583.2:551.311.12:551.481

Washington, D. C., National Research Council, **Physics of the earth. IX Hydrology.** Chapter 5, **Glaciers,** by F. E. Matthes, p. 149–219. Chap. 6, **Lakes,** by S. T. Harding, p. 220–243. New York and London, McGraw Hill, **1942. DWB**—A period of glacier expansion began about 1600 in Alps, Scandinavia and Iceland with maximums in 17th, 18th and 19th Centuries. Probably similar variations in Alaska, western ranges of U. S. A. and New Zealand. Climate milder in Middle Ages. Many of the smaller glaciers came into existence about 3600–4000 years ago after end of Climatic Optimum. Records of lakes in western part of Great Basin show low level in 1840's and a general upward trend to 1915, to a level higher than any in preceding 200 years. Since then downwards. *Subject Headings:* **Climatic changes, Glaciers, Lakes, Historical climates.**

G–170 551.583.2:631.4

Bryan, Kirk and Albritton, Claude C. Jr., **Soil phenomena as evidence of climatic changes.** *American Journal of Science*, 241:469–490, Aug. **1943. DWB, DLC**—Study of composite soils provides method of investigating climatic changes, especially of moisture in semi-arid regions. A soil at Praesum, Western Texas, is analyzed and shows three dry and two moist stages. *Subject Headings:* **Climatic changes, Historical climates, Soil climatology, Texas.**

G–171 551.583.2:551.461.2

Godwin, H., **Coastal peat beds of the British Isles and North Sea.** *Journal of Ecology*, 31:199–247, **1943. DA**—Gives pollen analyses of peat beds in a number of places round the British Isles. The main eustatic rise of sea level coincided with first expansion of warmth-loving trees. *Subject Headings:* **Climatic changes, Historical climates, Pollen analysis, Great Britain.**

G–172 551.583.2:58

Iversen, Johs., *Viscum, Hedera* **and** *Ilex* **as climatic indicators. A contribution to the study of the post-glacial temperature climate.** *Geologiska Föreningen i Stockholm, Forhandlingar*, 66:463–483, **1944. DLC**—From the climatic limits of regions now inhabited by mistletoe, ivy and holly, and their occurrence in post-glacial bogs, author estimates mean temperatures of warmest and coldest months for Djursland in Denmark in Atlantic (Jan. +0.5°C., July 18°) and Subboreal (Jan. −1°, July 18°) compared with present (Jan. 0°, July 16°C.). *Subject Headings:* **Climatic changes, Historical climates, Denmark.**

G–173 551.583.2:553.97:529

Welten, M., **Pollenanalytische, stratigraphische und geochronologische Untersuchungen aus dem Faulenseemoos bei Spiez.** [Pollen-analytical, stratigraphical and geochronological investigations from the Faulensee bog near Spiez.] *Geobotanisches Institut Rübel, Zürich, Veröffentlichungen*, 21, **1944.** 201 p. **DA**—Well preserved annual layers in a deep bog at Spiez on Thunersee enabled author to make an exact chronology of post-glacial from the retreat of the glacier in 7500 B.C. Twenty substages are set out, marked by changes of vegetation and alluvial content, showing oscillations of temperature and rainfall. Peak of Climatic Optimum dated ca. 4500 B.C. There was a minor warm period 6200–6000 B.C. Author gives a scatter diagram showing climatic indications of meadow, mixed oak forest, birch, spruce and beech. An important work. *Subject Headings:* **Climatic changes, Historical climates, Switzerland.**

G–174 551.583.2

Huntington, Ellsworth, **Mainsprings of civilization.** New York, John Wiley, London, Chapman and Hall, **1945.** 660 p. **DLC**—Includes a full discussion of changes of climate shown by caravan travel in Syria, frequencies of migrations to and from deserts, and growth of *Sequoia* in California. The concluding chapters summarize the author's views on world-wide climatic cycles during the historical period. *Subject Headings:* **Climatic changes, Historical climates, Syria, California.**

G–175 551.583.2:58

Post, Lennart von, **The prospect for pollen analysis in the study of the earth's climatic history.** *New Phytologist*, 45:193–217, **1946. DA**—History of post-glacial vegetation in Europe, New Zealand, southern South America, Hawaii, China, all show a warm period equivalent to a poleward shift by about 5° of latitude. Besides this is a shorter oscillation of about 900 years between drier and wetter conditions. *Subject Headings:* **Climatic changes, Historical climates, Pollen analysis.**

G–176 551.583.2:58(73)

Hansen, H. P., **Postglacial forest succession, climate and chronology in the Pacific North-west.** *American Philosophical Society, Transactions*, 37, Part 1, 1–130, **1947. DLC**—Climate cooler and moister in early post-glacial than at any time since. Owing to Pacific Ocean the warm dry period of 6000–2000 B.C. is not found on the coast, but occurs inland. There was a slight increase of moisture (expansion of Hemlock) shortly after 7000 B.C. and a sharp reversion to cooler and moister conditions about 2000 B.C. A warm dry period occurred in Great Basin at Climatic Optimum, with almost complete disappearance of glaciers. Historical period also discussed in Great Basin and Alaska. *Subject Headings:* **Climatic changes, Historical climates, Pacific Northwest.**

G–177 551.583.2(42)

Pennington, W., **Studies on the post-glacial history of British vegetation. VII. Lake sediments: pollen diagrams from the bottom deposits of the north basin of Windermere.** *Royal Society of London, Philosophical Transactions*, B, 233:137–175, **1947. DLC**—Eight pollen diagrams from cores forming an E.-W. transect are described. They showed two layers of barren clay separated by silt with birch and pine, correlated with valley glaciation and Upper and Lower *Dryas* clays and cold-temperate Alleröd Oscillation. Correlation table given. *Subject Headings:* **Climatic changes, Historical climates, Great Britain.**

G–178 551.583.2:519.2(73)

Schulman, Edmund, **Tree-ring hydrology in Southern California.** Tuscon, *University of Arizona, Bulletin*, 18(3), **1947.** *Laboratory of Tree-ring Research Bulletin* No. 4. 36 p. **DLC**—Correlation between growth of spruce and seasonal rainfall permitted long-period regional estimates of rainfall variations along Pacific coast since 1350. Curves given and major variations noted. *Subject Headings:* **Climatic changes, Historical climates, Dendrochronology, Southern California.**

G–179 551.583.2:639.2

Storrow, B., **Concerning fluctuations and the teaching of ecology.** Durham, England, University, Armstrong College, Newcastle-upon-Tyne, *Dove Marine Laboratory, Cullercoats, Report Aug. 1, 1940 to July 31, 1946*, p. 7–58 **(1947). DA**—Fluctuations of climate in Britain and western Europe and ice in Arctic since before 1200 are compared with variations in products of fishing for whales, salmon, herring, pilchard, tunny, cod, oysters, and agreement is found, especially with herring. North American fluctuations discussed since 1800. *Subject Headings:* **Climatic changes, Historical climates, Ecology.**

G–180 551.583.2:58(71)

Wenner, C. G., **Pollen diagrams from Labrador.** *Geografiska Annaler*, 29:137–374, **1947. DLC**—The succession shows three main stages, moist, dry, moist, with minor fluctuations. The dry warm Climatic Optimum came not long after the retreat of the ice-edge; it ended with extensive marsh formation. Comparisons made with other Arctic regions. *Subject Headings:* **Climatic changes, Historical climates, Pollen analysis, Labrador.**

G–181 551.583.2:551.311.12:551.513

Ahlmann, H. W:son, **Glaciological research on the North Atlantic coasts.** *London, Royal Geographical Society, Research Series* No. 1, **1948.** 83 p. **DLC**—Give details of advances and retreats of glaciers from about 870 A.D. Recent recession attributed to stronger atmospheric circulation, not increased solar radiation. Other evidence of recent changes of temperature is discussed. *Subject Headings:* **Climatic changes, Historical climates, Glaciers, North Atlantic Coasts.**

G–182 551.583.2(73)

Antevs, Ernst, **The Great Basin, with emphasis on glacial and post-glacial times. III. Climatic changes and pre-white man.** Salt Lake City, *University of Utah Bulletin*, 38(20):168–191, **1948 DLC**—Post-glacial warm period due to universal cause with regional contributing factors. Proposes new terminology: Period since 7000 B.C. *Neothermal*, divided into *Anathermal* (7000–5000 B.C.), *Altithermal* (5000–2500 B.C.) and *Medithermal* (since 2500 B.C.). Gives variations of level of Summer Lake and some dating. *Subject Headings:* **Climatic changes, Historical climates, Great Basin.**

G–183 551.583.2(09)(51)

Schove, D. J., **Chinese "raininess" through the centuries.** *Meteorological Magazine*, London, 78:11–16, **1949. DLC**—Summarizes Chinese annals in north, central and southern China from 200 B.C. and variations of travel across dry belt to west, and gives curves of estimated raininess. Evidence not very satisfactory, but indicates a series of oscillations. *Subject Headings:* **Climatic changes, Historical climates, China.**

SECTION IV. CLIMATIC CHANGES SHOWN BY INSTRUMENTAL METEOROLOGICAL OBSERVATIONS (ROUGHLY SINCE A. D. 1700) (551.583.1)

G–184 551.583.15:551.21

Abbot, C. G. and Fowle, F. E., **Volcanoes and climate.** *Smithsonian Institution Miscellaneous Collections*, 60, No. 29, **1913.** 24 p. **DLC**—The eruption of Mt. Katmai, Alaska, on June 6–7, **1912**, was followed by haziness and a reduction of nearly 10 per cent of intensity of solar radiation reaching the earth. Similar periods of haze occurred after great eruptions in former years. Variations of temperature since 1880 agree with a combination of volcanic effect and reversed sunspot cycle. *Subject Headings:* **Climatic variations, Historical climates, Volcanic dust.**

G–185 551.583.14

Brooks, C. E. P., **The secular variation of rainfall.** *Royal Meteorological Society, Quarterly Journal*, 45:233–245, **1919. DLC—The secular variation of climate.** *Geographical Review*, 11:120–135, **1921. DLC**—Author correlated annual totals of rainfall (1st paper), means of pressure and temperature (2nd paper) from earliest data up to about 1911 with "time" for stations all over the world, plotted the coefficients on world maps, and discussed the inter-relations. *Subject Headings:* **Climatic variations, Historical climates.**

G–186 551.583.15

Brooks, C. E. P., **A period of warm winters in Europe.** *Meteorological Magazine*, London, 57:203–205, **1922. DWB**—A chart shows temperature difference, Dec.–Feb., 1911–1920 minus 1851–1910 in Europe. One of the first records of the present change of climate. *Subject Headings:* **Climatic variations, Historical climates, Europe.**

G–187 551.506.3

***World weather records collected from official sources.** *Smithsonian Miscellaneous Collections*, Washington, D. C., Vol. 79, 1199 p. **1927**; 90, 616 p. **1934**; 105, 646 p. **1947. DLC**—Give monthly and annual values of mean pressure and temperature and total precipitation, with details of station history, for several hundred stations well distributed over the world. Vol. 79 covers period from beginning of observations to 1920; vol. 90, 1921–30; vol. 105, 1931–40. An indispensable collection of data. *Subject Headings:* **Climatic variations, Historical climates.**

G–188 551.583.1:551.513

Wagner, A., **Untersuchung der Schwankungen der allgemeinen Zirkulation.** [Investigation of the oscillations of the atmospheric circulation.] *Geografiska Annaler*, 11:33–88, **1929. DLC**—Gives and discusses charts of mean annual pressure, temperature and precipitation, (1911–20)–(1886–95) and change of amplitude and phase of annual variation of temperature. The investigation brings out the connection between the general circulation and the main lines of distribution of climatic elements. Effect of sunspots is also discussed. *Subject Headings:* **Climatic variations, Historical climates.**

G–189 551.553.5(41)

Brooks, C. E. P. and Hunt, Theresa M., **Variations of wind direction in the British Isles since 1341.** *Royal Meteorological Society, Quarterly Journal*, 59:375–388, **1933. DLC**—Gives resultant wind direction and "constancy" for winter, summer and year for each year for London (1671–85, 1713–47, 1787–1930); Edinburgh (1731–36, 1754–1930); Dublin (1725–66, 1831–1930); also from Merle's diary, 1341–3, and some indications for other early periods. *Subject Headings:* **Climatic variations, Historical climates, Atmospheric circulation, Great Britain.**

G–190 551.583.1:551.513:523.74

Ångström, Anders, **Teleconnections of climatic changes in present time.** *Geografiska Annaler*, 17:242–258, **1935. DLC**—Deals mainly with teleconnections of temperature changes between distant regions through (1) variations of energy reaching the earth; (2) variations of atmospheric circulation. *Subject Headings:* **Climatic variations, Historical climates.**

G–191 551.524.35(42)

Lewis, Lilian F., **Variations of temperature at Oxford, 1815–1934.** London, H. M. Stationery Office, **1937.** (Great Britain, *Meteorological Office, Professional Notes* No. 77.) 12 p. **DWB**—Gives mean dry-bulb temperature (deviation from normal) for each month and 20-year seasonal moving averages, frequency curves etc. Winter curve continued to 1947 in *Royal Meteorological Society, Quarterly Journal*, 74:77, **1948.** 20-year curves for London, 1764–1939 given in *Meteorological Magazine*, London, 76:135–138, **1947.** *Subject Headings:* **Climatic variations, Historical climates, London.**

G–192 551.524.34(98)

Scherhag, R., **Die Erwärmung der Arktis.** [The warming of the Arctic.] *Journal du Conseil International pour l'Exploration de la Mer*, Copenhagen, 12:263–276, **1937.** See also *Meteorological Magazine*, London, 73:29–32, **1938. DLC**—Calls attention to increased mildness of winters in temperate zone during past 100 years and retreat of the ice. Attributed to increase in Gulf Stream Drift due to a 225-year cycle of atmospheric circulation, now about its maximum. *Subject Headings:* **Climatic variations, Historical climates, Arctic.**

G–193 551.524.34:551.513(485)

Ångström, Anders, **The change of the temperature climate in the present time with some remarks on the cause of minor fluctuations in prehistoric time.** *Geografiska Annaler*, 21:119–131, **1939. DLC**—Illustrates secular change at Stockholm and charts differences 1859–1900 to 1901–30. These and also minor prehistoric changes of climate are attributed to changes of atmospheric circulation which form a basis for correlation of varves in different continents. *Subject Headings:* **Climatic variations, Historical climates, Stockholm.**

G–194 551.583.14(481)

Hesselberg, Th. and Birkeland, B. J., **Säkulare Schwankungen des Klimas von Norwegen.** [Secular oscillations of the climate of Norway.] *Geofysiske Publikationer*, 14, No. 4, Norske Videnskaps Akademi, Oslo, **1940. DWB**—Compares a number of long temperature records and finds similar variations (Stockholm, Copenhagen, Edinburgh, Stykkisholm). Rise greatest in recent years in winter, least in summer. In Norway secular rise increases northward and inland. Increase of precipitation only 10 per cent. *Subject Headings:* **Climatic variations, Historical climates, Norway.**

G–195 551.583.1(42)

Manley, Gordon, **The Durham meteorological record 1847–1940.** *Royal Meteorological Society, Quarterly Journal*, 67:363–380, **1941. DWB**—Discussion and computation for each month of mean temperature, maximum and minimum temperatures, and sunshine. *Subject Headings:* **Climatic variations, Historical climates, Durham, England.**

G–196 551.506.3:551.524(41)

Glasspoole, J. and Hogg, W. H., **Serial monthly values of mean temperature over the British Isles 1881–1940 and annual values 1866–1940.** *Royal Meteorological Society, Quarterly Journal,* 68:45–57, 1942. 5 tables. **DWB**—Also includes monthly means for each year, 1901–40, for England and Wales, Scotland and Ireland separately. *Subject Headings:* **Climatic variations, Historical climates, Great Britain.**

G–197 551.506.3:551.524(492)

Labrijn, A., **200 jaar temperaturwaarnemingen in Nederland.** [200 years temperature observations in Netherlands.] *Hemel en Dampkring,* 40:41–45, 1942.—Gives, for De Bilt, 10-year monthly and seasonal averages of mean temperature. There has been an upward trend of winter temperatures but no marked change in other seasons. *Subject Headings:* **Climatic variations, Historical climates, Netherlands.**

G–198 551.583.1(492)

Labrijn, A., **The climate of the Netherlands during the last two and a half centuries.** *Netherlands Meteorologisch Instituut, Mededelingen en Verhandelingen* No. 49, 1945. 114 p. **DWB**—Gives tables of mean winter and summer temperatures and difference, and amount of rainfall, 1735–1944, and mean wind direction by 30-year periods 1700–1944. Maritime influences decreased from 1750 to a minimum 1770–90, then increased again. Steady rise of mean temperature since 1790. *Subject Headings:* **Climatic variations, Historical climates, Netherlands.**

G–199 551.506.3:551.524(42)

Manley, Gordon, **Temperature trend in Lancashire, 1753–1945.** *Royal Meteorological Society, Quarterly Journal,* 72:1–31, 1946. **DLC**—Gives estimated means Oct. 1753–1780, monthly means 1781–1946, for Lancashire plain, with curves and 10-year summaries. *Subject Headings:* **Climatic variations, Historical climates, Lancashire.**

G–200 551.506.3(481)

Birkeland, B. J., **Old meteorological observations at Trondheim. Atmospheric pressure and temperature during 185 years.** Norske Videnskaps Akademi, Oslo, *Geofysiske Publikationer,* 15, No. 4, 1949. 38 p. **DWB**—Monthly means for each year, pressure 1762–1945, temperature 1761–1946, some data of precipitation. *Subject Headings:* **Climatic changes, Historical climates, Trondheim.**

G–201 551.583.14

Lysgaard, Leo, **Recent climatic fluctuations.** *Conseil Permanent International pour l'Exploration de la Mer, Rapports et Procés-Verbaux,* 125:17–20, 1949. **DLC**—Gives curves smoothed over 30 years of temperature and precipitation, 1781–1947, for various stations, numbers of abnormal seasons and world maps of differences (1911–40)–(1881–1910) of temperature and pressure, Jan. and July, and annual precipitation. For a larger work *see* 6–86. *Subject Headings:* **Climatic variations, Historical climates.**

PART III. METEOROLOGICAL ARTICLES APPEARING IN RECENTLY ISSUED PUBLICATIONS

Note: The contents of periodicals, included in this section, are for information only, and will not be listed in either the author or subject indexes. When material is furnished in advance of date of publication, the pagination may be omitted.

American Geophysical Union, Transactions, Volume 31, Number 3, June 1950.

Fletcher, Robert D.: **A relation between maximum observed point and areal rainfall values**, p. 344–348.

Yamamoto, Gi-ichi: **Investigations of evaporation from pans,** p. 349–356.

Wiegel, Robert L.: **Experimental study of surface waves in shoaling water,** p. 377–385.

Johnson, J. W.: **Relationships between wind and waves, Abbotts Lagoon, California,** p. 386–392.

Pollak, M. J.: **The water structure in the Brownson Deep,** p. 386–397.

Groen, P. and Weenink, M. P. H.: **Two diagrams for finding breaker characteristics along a straight coast,** p. 398–400.

Hess, H. H. and Buell, M. W. Jr.: **The greatest depth in the oceans,** p. 401–405.

Benson, Manuel A.: **Use of historical data in flood-frequency analysis,** p. 419–424.

Roessel, B. W. P.: **Hydrologic problems concerning the runoff in headwater regions,** p. 431–442.

Stoltenberg, N. L. and Wilson, T. V.: **Interception storage of rainfall by corn plants,** p. 443–448.

Gerdel, R. W., Lyle Hansen, B. and Cassidy, W. C.: **The use of radioisotopes for the measurement of the water equivalent of a snow pack,** p. 449–453.

Annalen der Meteorologie, Volume 3, Number 1–2, 1950.

Roll, Hans-Ulrich: **Gedanken über den Zusammenhang der vertikalen Profile von Windgeschwindigkeit und Temperatur in der wassernahen Luftschicht,** [Ideas on the relation of the vertical profile of wind speed and temperature in the air layer near the water], p. 1–9.

Prager, Erwin: **Zur Frage der Erwärmung kalter Festlandsluft nach ihrem Übertritt auf See** [On the question of warming of cold continental air after its passage over the sea], p. 10–19.

Collmann, Wolfgang: **Troposphärische Mitteltemperaturen der Hauptluftmassen über Nordwestdeutschland,** [Tropospheric mean temperature of the principal air masses over Northwest Germany], p. 20–25.

Rodewald, M.: **Die Wirbelstrasse bei Jan Mayen,** [The eddy track at Jan Mayen], p. 25–26.

Hartmann, Wilhelm: **Die Genauigkeit der Ermittlung des Höhenwindes aus den Karten der absoluten Topographie,** [The accuracy of the estimation of upper winds from charts of absolute topography], p. 27–34.

Flohn, Hermann: **Zur physikalischen Deutung der Witterungsregelfälle** (I Mitteilung), [On the physical meaning of examples of weather rules (1st communication)], p. 57–59.

Penndorf, Rudolf: **Das ultraviolette Sonnenspektrum auf Grund neuerer Messungen (Raketenaufstiege),** [The ultraviolet solar spectrum on the basis of recent measurements (rocket ascents)], p. 35–37.

Abild, Bruno: **Zum täglichen Temperaturgang in der freien Atmosphäre,** [On the diurnal variation of temperature in the free atmosphere], p. 38–41.

Schulze, Werner: **Platzhöhen von Radiosondenballonen und Ozongehalt der freien Atmosphäre** [Bursting heights of radiosonde balloons and ozone content of the upper atmosphere], p. 42–48.

Hinzpeter, Max: **Grundlagen der Temperaturkorrektion bei Aneroidbarometern in Radiosonden** [Basis of temperature correction to aneroid barometers in radiosondes], p. 49–53.

Seilkopf, Heinrich: **Zur Geschichte der meteorologischen Arbeit an der Deutschen Seewarte Hamburg,** [On the history of meteorological work at the Deutsche Seewarte, Hamburg], p. 53–56.

Annalen der Meteorologie, Volume 3, Number 3–4, 1950.

Hollmann, Günther: **Zur Dynamik der Druck- und Drucktendenzfelder,** [On the dynamics of pressure and pressure-tendency], p. 65–73.

Baur, Franz: **Über falsche und richtige Statistik in der Meteorologie,** [On false and true statistics in meteorology], p. 74–83.

Staude, Rudolf: **Über Formveränderungen und Achsenbewegung von 24-stündigen Bodendruckänderungsgebieten und deren Lage zum Frontverlauf erläutert an einigen besonders markanten synoptischen Entwicklungen,** [On changes of shape and axial movements of 24-hour surface isallobars and their position in relation to the course of fronts illustrated by some specially striking synoptic developments], p. 84–91.

Wahl, Eberhard: **Strahlungseinflüsse bei Wassertemperaturmessung an Bord von Schiffen. (Ein Beitrag zur Fehlersystematik von Schiffsbeobachtungen),** [Radiation effects in measurements of water temperature on board ships. (A contribution to the study of errors of ships' observations)], p. 92–102.

Gödecke, Karl: **Die "vollständige" Temperaturkorrektion an Stations-Barometern mit nicht einstellbarem Teilungsnullpunkt,** [The "complete" temperature correction for station barometers with non-adjustable zero], p. 103–105.

Georgi, J.: **Regierungsrat a.D. Dr. Paul Perlewitz,** [Retired Councellor of the government of Germany Dr. Paul Perlewitz], p. 106.

Müller-Annen, Hans: **Über den statistischen Hintergrund der Singularitäten. (Untersuchungen, Gedanken und Methoden zur Langfristvorhersage. 4 Beitrag),** [On the statistical background of singularities. (Investigations, ideas and methods of long range forecasting. Fourth contribution)], p. 107–115.

Becker, Richard: **Eine Darstellung der mittleren Niederschlagsmengen in Verbindung mit der Expansionsarbeit,** [An exposition of the average rainfall amounts in relation to the work of expansion], p. 115–118.

Franke, M.: **Bemerkungen über die Zeit- und Höhenabhängigkeit des Austauschkoefficienten. (vorläufige Mitteilung),** [Remarks on the relation of the exchange coefficient to time and height. (Advance communication)], p. 118–119.

Prandtl, L.: **Über Mammatuswolken,** [On mammatus clouds], p. 119–120.

Annalen der Meteorologie, Medizin-meteorologische Hefte, No. 1, 1949.

Kestner, Otto: **Die Einwirkung des Seeklimas auf den Menschen,** [The influence of sea climate on man], p. 3–5.

Döhring, F.; **Seeklima und Hautkrankheiten,** [Sea climate and skin diseases], p. 5–6.

Schulze, Rudolf: **Das Strahlungsklima der Erde,** [The radiation climate of the earth], p. 6–13.

Dammann, Walter: **Klimatologie der Nordseeküste unter dem Gesichtspunkt der Berücksichtigung verschiedener Witterungsabschnitte,** [Climatology of the North Sea coast from the point of view of various spells of weather], p. 13–18.

Rominger, E.: **See-Kuren im Kindesalter,** [Marine health resorts in childhood], p. 18–23.

Aschenbrenner, Reinhard: **Seeklima und Herzkrankheiten,** [Sea climate and heart diseases], p. 38–41.

Sauer, Walter: **Das Heilklima der See bei chronischer Bronchitis und Bronchiektasen,** [The curative climate of the sea in chronic bronchitis and bronchial dilation], p. 23–30.

Erichson, Kurt: **Hamburger Sozialfürsorge und Meeresheilkunde,** [The Hamburg Social Welfare and maritime Medical Science], p. 30–38.

Naegeli, Th.: **Zur Therapie der extrapulmonalen Tuberkulose in der Ebene, im Gebirge und an der See,** [On the therapy of extrapulmonary tuberculosis on the plains, in the mountains and at the sea], p. 42–50.

Ullmann, Kurt: **Die Behandlung der Knochen-und Gelenktuberkulose an der See,** [The treatment of bone and joint tuberculosis at the sea], p. 50–57.

Goeters, Walter:. **Die Bedeutung des Nordseeklimas für die Behandlung der extrapulmonalen Tuberkulose im Kindesalter,** [The importance of the North Sea climate for the treatment of extrapulmonary tuberculosis in childhood], p. 57–61.

Effenberger, H.: **Zum Einfluss des Nordseeklimas auf die Lungentuberkulose Erwachsener,** [The influence of the North Sea climate on pulmonary tuberculosis in adults], p. 61–65.

Krauel, G.: **Der Einfluss des Nordseeklimas auf das vegetative Nervensystem,** [The influence of the North Sea climate on the vegetative nervous system], p. 66–68.

Leistner, Walter: **Das maritime Kernaerosol und seine Änderung landeinwärts,** [The maritime nuclear aerosol and its change inland], p. 68–73.

Haeberlin, Carl: **Praktische Erfahrungen an den Seeküsten,** [Practical experiences on the sea coast], p. 73–79.

Bürger-Prinz, H.: **Die Umwelt und die Psychiatrie,** [Environment and psychiatry], p. 41.

Annalen der Meteorologie, Medizin-meteorologische Hefte, No. 2, 1950.

Schulze, Rudolf: **Über den Zusammenhang von Wetter und Krankheit,** [On the connection between weather and illness], p. 1–10.

Kuhnke, Wolfgang and Zink, Otto: **Erfahrungen mit einer medizin-meteorologischen Vorhersage,** [Experiments with a medical-meteorological forecast], p. 11–26.

Berg, Hellmut: **Kauistik, Statistik und Experiment im meteorologischen Grenzgebiet,** [Cas history, statistics and experiment in the realm of medical meteorology], p. 27–32.

Ciel et Terre; Volume 66, Number 1–2, Jan.–Feb. 1950.

Cox, J. F.: **Hommage à la Marquise du Châtelet,** [Homage to the Marquise du Chatelet] p. 1–11.

Van Mieghem, J.: **Progrès récents en aérologie synoptique,** [Recent progress in synoptic aer ology], p. 12–21.

Ciel et Terre, Volume 66, Number 3–4, March–April, 1950.

Couffignal, L.: **La Méthode de H. Labrouste pour la rechèrche des périodes,** [H. Labrouste' method for the research of periodicites], p. 78–86.

Sneyers, R.: **Le temps en janvier et février 1950,** [The weather in January and February 1950] p. 101–102.

Ciel et Terre, Volume 66, Number 5–6, May–June 1950.

Van Mieghem, Jacques: **La température de l'air au sol,** [Surface temperature of the air], p 113–116.

Sneyers, R.: **Le temps en mars et avril 1950,** [The weather in March and April 1950], p. 160–162

Hemel en Dampkring, (the Hague) Volume 48, Number 1, January 1950.

Visser, S. W.: **De zonnevlekken et het weer,** [Sunspots and the weather], p. 1–9.

van der Ham, C. J.: **De terminologie der weersverwachtingen,** [The terminology of the weathe forecast], p. 10–16.

Hemel en Dampkring, Volume 48, Number 2, February 1950.

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